Notice of meeting of
Planning Guidance & Sustainable Development Scrutiny Sub-Committee

To: Councillors Bartlett, Hogg, Simpson-Laing, Smallwood (Vice-Chair), Vassie (Chair) and Parlabean (Non-voting Co-opted Member)

Date: Monday, 17 July 2006

Time: 4.00 pm

Venue: The Guildhall, York

A G E N D A

Please note that the draft report enclosed at agenda item 4 of this agenda has been produced with extremely tight timescales in order to meet the statutory publication requirements for this meeting. Due to exceptional circumstances surrounding the publication of this report, the version enclosed with this agenda is not the final one that Members will be considering. At the time of preparing this agenda, it is anticipated that a complete finalised version of this report will be published early to mid part of next week. In the meantime, the enclosed report provides an outline of the review to date and of the potential recommendations arising from it.

1. **Declarations of Interest**
   At this point Members are asked to declare any personal or prejudicial interests they may have in the business on this agenda.

2. **Minutes** (Pages 1 - 4)
   To approve and sign the minutes of the meeting of the Planning and Transport Scrutiny Board held on 28 February 2006.

3. **Public Participation**

At this point in the meeting members of the public who have registered their wish to speak regarding an item on the agenda or an issue within the Panel's remit can do so. Anyone who wishes to register or requires further information is requested to contact the Democracy Officer on the contact details listed at the foot of this agenda. The deadline for registering is Friday 14th July 2006 at 10.00am.

4. Draft Final Report of the 'Guidance for Sustainable Development' Scutiny topic (Pages 5 - 92)

Members will consider the final draft of the report of the Planning and Transport Scrutiny Board into Guidance for Sustainable Development. Members will be asked to agree the content, format and recommendations of the report. The agreed report will then be considered by Scrutiny Management Committee on Monday 24 July.

5. Any other business which the Chair considers urgent under the Local Government Act 1972

Democracy Officer:

Name: Tracy Johnson
Contact details:

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For more information about any of the following please contact the Democracy Officer responsible for servicing this meeting Tracy Johnson Democracy Officer

- Registering to speak
- Business of the meeting
- Any special arrangements

- Copies of reports

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Agenda Item 2

Minutes

MEETING	PLANNING AND TRANSPORT SCRUTINY BOARD
DATE	28 FEBRUARY 2006
PRESENT	COUNCILLORS SMALLWOOD (in the Chair), BARTLETT, HOGG, JAMIESON-BALL and SIMPSON-LAING DON PARLABEAN (Non-voting co-opted member)
APOLOGIES	COUNCILLOR VASSIE

40. DECLARATIONS OF INTEREST

Members were invited to declare any personal or prejudicial interests which they might have in any of the business on the agenda.

No interests were declared.

41. MINUTES

RESOLVED: That the minutes of the meeting of 1 February 2006 be approved and signed as a correct record.

42. PUBLIC PARTICIPATION

It was reported that there had been no registrations to speak at the meeting under the Council's Public Participation Scheme.

43. GUIDANCE FOR SUSTAINABLE DEVELOPMENT

Members received a report which provided them with an opportunity to discuss and review the sustainable development guidance from other local authorities that had been circulated to them following previous meetings, and presented an amalgamated version of their guidance on land use and waste (attached at Annexes A & B).

Members highlighted the need to draw together their work on sustainable development and draft a final report for consideration at the April meeting of the Board. They also agreed to invite the Principal Development Officer (Forward Planning) from the City Development Team to brief them on progress with the Local Development Framework and its impact on sustainable development at an informal meeting in March.

RESOLVED: (i) That the sustainable development guidance from other local authorities be noted;

(ii) That the content of the amalgamated version of local authorities' guidance on land use and waste be noted and that an executive summary be produced listing key objectives for developers;

(iii) That the Principal Development Officer (Forward Planning) from the City Development Team be invited to brief the Board on progress with the Local Development Framework and its impact on sustainable development at an informal meeting in March;

(iv) That a final report on the sustainable development topic be drafted for consideration at the April meeting of the Board.

44. UPDATE ON THE LEGISLATIVE AND MONITORING FRAMEWORKS SUPPORTING SCRUTINY BOARD RESEARCH AND FINDINGS FOR ENERGY MONITORING AND MANAGEMENT, AND SUSTAINABLE ENERGY SOURCING

Members received a report which provided them with an overview of recent changes to legislative and monitoring frameworks to inform the Board's decisions, findings and recommendations on the topic 'Guidance for Sustainable Development'.

The report covered the following legislative and monitoring frameworks:

- Comprehensive Performance Assessment (CPA), Best Value Performance Indicators (BVPI's) and Recommended Indicators;
- Gershon Efficiencies;
- The EU Buildings Directive;
- Planning Policy Statement 22: Renewable Energy;
- Revisions to the Buildings Regulations;
- The National Code for Sustainable Buildings.

In March 2005 the UK Government Sustainable Development Strategy 'Securing the Future' was published. The associated guidance for monitoring, entitled 'Local Quality of Life Indicators – Supporting Local Communities to Become Sustainable', which included complementary indicators for Local Authorities and Local Strategic Partnerships, was published in August 2005. The guidance recommended Local Authorities and Local Strategic Partnerships adopt nine local quality of life indicators, three of which had a particular bearing on energy and environmental impact:

- 24 – Levels of key air pollutants;
- 25 – Carbon dioxide emissions by sector and per capita emissions;

- 26 – Average annual domestic consumption of gas and electricity (kwh).

Whilst the indicators were voluntary (i.e. non-statutory), they were drafted to flesh out statutory indicators and help monitor the effectiveness of Sustainable Community Strategies.

RESOLVED: (i) That the legal and monitoring frameworks outlined in the report be noted;

(ii) That it be agreed that the final report include a recommendation to the Executive to adopt and integrate quality of life indicators 24 and 25 into the monitoring framework at City of York Council, as recommended in the guidance 'Local Quality of Life Indicators – Supporting Local Communities to Become Sustainable'.

D SMALLWOOD (in the Chair)

The meeting started at 6.35 pm and finished at 7.05 pm.

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Sustainable Planning Guidance Scrutiny Sub-Committee 17th July 2006

Report of the Head of Civic, Democratic and Legal Services

Draft Final Report: Sustainable Planning Guidance Sub-Committee

Summary

1. Members of the Sustainable Planning Guidance Scrutiny Sub-Committee are presented with the draft final report of the Planning and Transport Scrutiny Board delivering their research and findings regarding approaches the Local Authority might take to supporting and delivering more sustainable development.

2. Members of the Sub-Committee are recommended to;

- consider the content, format and recommendations held in this report
- agree, the form of any amendments, and subject to these its submission to Scrutiny Management Committee (SMC) in line with their decision to complete outstanding scrutiny topics as a matter of urgency.

Background

3. Between 2005-2006 Scrutiny[1] at the City of York Council advanced the development more robust and holistic strategic approaches to delivering sustainability particularly in respect of carbon reduction and energy sourcing across all sectors of the Council's work bar transportation fuel.

4. In 2005 Members of the Planning and Transport Scrutiny Board chose to progress a registered topic regarding sustainable planning. The topic was considered by the Planning and Transport Scrutiny Board to be the a significant area for Scrutiny recommendations supporting the authority to monitor the development of its new local development framework and achieve in partnership with other public and private sector interests a more sustainable future for York's planning and development.

5. The draft report at Annex A presents a summary of their findings and possible recommendations at completion of their review.

[1] Through work of the Boards: Environment and Sustainability, Housing and, Planning and Transport

Consultation

6. During the course of this scrutiny, English Heritage and other groups representing the historic interests of the city were asked to give a presentation and were consulted through correspondence regarding the obstacles and benefits they saw to increased levels of sustainable building in a historic environment.

7. A number of other Local Authorities were consulted regarding region wide and national exemplars for presentation to the Board in respect of best practice encouraging greater degrees of sustainable development.

8. City of York Council (CYC) Officers from Planning, Buildings Control and the Sustainability Officer acted as the boards principal support for base line data, and also met with a sub-groups of the Board to help answer further enquiries.

Options

9. **Either:** To approve the findings and recommendations of the Board in the report at Annex A

10. **Or:** To recommend no change to the authority's operations and approach to planning and developing sustainably at this time

Analysis

11. The report at Annex A was drafted in line with;
    a. the objectives of the topic registration as lodged (see attached draft final report)
    b. findings of the board regarding the advice of the consultees (see above under 'Consultation')
    c. the boards gap analysis of authority base line data for this area revealed through completion of the scrutiny research

Corporate Objectives

12. The Scrutiny fits with the aims of the following Corporate Objectives

    'Corporate Aim 1: Take Pride in the City, by improving quality and sustainability, creating a clean and safe environment.' With particular reference to:

    1.2. Protect and enhance the built and green environment that makes York unique.

    1.3. Make getting around York easier, more reliable and less damaging to the environment.

1.4. Protect residents and our environment from pollution and other public health and safety hazards and act as role model in the sustainable use of resources.

12. Analysis is also given in the Glossary of the report at Annex A regarding the Scrutiny's relationship with the Comprehensive Performance Assessment (CPA) framework.

Implications

13. There are no known implications in relation to the following at this stage of the draft final report:

- **Finance**
- **Human Resources (HR)**
- **Equalities**
- **Legal**
- **Crime and Disorder**
- **Information Technology (IT)**
- **Property**
- **Other**

Risk Management

14. There are no risk management implications associated with the draft final report at this stage.

Recommendations

15. Members of the Sub-Committee are recommended to;

i. Consider the content, format and recommendations held in this report
ii. Agree, subject to any amendments, its submission to SMC in line with their decision to complete outstanding scrutiny topics as a matter of urgency.

Reason

16. To facilitate completion of the former Environment and Sustainability Board's outstanding work.

Contact Details

Author:
Author's name: Ruth Sherratt
Title: Scrutiny Officer
Dept Name: Scrutiny Services
Tel No. 01904 552066

Chief Officer Responsible for the report:
Chief Officer's name: Suzan Hemingway
Title: Head of Civic, Legal and Democratic Services

Report Approved ✓ **Date** 13/06/2006

Specialist Implications Officer(s)
None

Wards Affected: *List wards or tick box to indicate all* **All** √

For further information please contact the author of the report

Background Papers:

Draft Final Report: at Annex A
And as listed in the draft final report at Annex A.

Annexes

Annex A Draft Final Report: at Annex A

FINAL DRAFT FOR CONSULTATION

CITY OF YORK COUNCIL

ANNEX A

Sustainable Development Scrutiny Sub-Committee

Guidance for Sustainable Development.

Agreed at Sustainable Development Scrutiny Sub-Committee 17th July 2006

Considered by Scrutiny Management Committee xxxxJuly 2006

Agreed at Executive Date XXXXX

Compiled by R. Sherratt

Chair's Foreword

Contents

SUMMARY OF RECOMMENDATIONS

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7.

8. That Sub Committee considering the final report of the final report of the former Planning and Transport Scrutiny Board regarding sustainable development be requested to include a recommendation to developers -in the form of an amendment to the Supplementary Planning Guidance (SPG) – that all new or significantly refurbished developments should incorporate sustainable street lighting.

9.

Summary of Implications of Recommendations for City of York Council

Implications Recommendation 1.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 2.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 3.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 4.	
Finance	

Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 5.	
Finance	
Human Resources	
Equalities	
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Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 6.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 7.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	

Information Technology	
Property	
Other	
Implications Recommendation 8.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 9.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 10.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 11.	

Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	
Implications Recommendation 12.	
Finance	
Human Resources	
Equalities	
Legal	
Crime and Disorder	
Information Technology	
Property	
Other	

Final Report: Guidance for Sustainable Development.

Summary

1. Members of the Executive are presented with the final report of the Sustainable Development Scrutiny Sub-Committee (formerly Environment & Sustainability Planning and Transport Scrutiny Board) delivering their research and findings regarding the approach our Local Authority might take to delivering more sustainable planning and development.

Background

2. Between 2005 and 2006 Scrutiny[1] at the City of York Council advanced the development of more robust and holistic strategic approaches to delivering carbon reduction and energy sourcing within the authorities own activities. These approaches have covered all sectors of the Council's work bar transportation fuel, including;

   a. CO_2 reduction from domestic property: public and private
   b. Sustainable Street Lighting
   c. Reducing managing and monitoring energy consumption in council property
   d. Ensuring increasingly sustainable supply and embedded micro-generation in council property

3. The Commercial Services Scrutiny Board also began work on improvements regarding recycling and reuse.

4. The work of the planning and Transport Scrutiny Board[2] was considered to be a significant area for Scrutiny recommendations supporting the authority working in partnership with individuals, public and private sector organisations to ensure that;

   1. Our Local Development Framework incorporates the highest enforceable levels of sustainability
   2. Our special planning guidance steers towards the adoption of standards of sustainable excellence
   3. Recent changes to the National Planning Policy framework promoting greater sustainability are adopted.
   4. Our authority meets the Audit Commission's aims for increased sustainable assessment in the Comprehensive Performance Assessment (CPA); for more information regarding Comprehensive Performance Assessment see glossary
   5. Our citizens are given greater access to and understanding of the imperatives for sustainable building and how to achieve this

5. Members agreed their research should include;

[1] Through work of the Boards: Environment and Sustainability and Housing,
[2] See Annex A for the topic registration form

i. Examination of planning guidance for sustainable development used elsewhere in the UK.
ii. Further information from the Local Government Association (LGA) and the Local Government Information Unit (LGIU) where relevant.
iii. Liaison with the City Development Team to ensure sustainability is incorporated into the fourth set of changes to the Local Plan.
iv. Keeping abreast of legislative changes taking place affecting regional planning guidance, including targets for waste disposal and renewable energy, and how statutory requirements and could be incorporated and their implications assessed.
v. Consultation with English Heritage, consultation with and visits to Housing Association responsible for Fieldside Place, St Nicholas Field's Environmental Community Centre, Kirklees Council regarding the Sun cities solar programme and Zen.

6. During the course of the Scrutiny Members considered the enforceable and voluntary mechanisms this and other Local Authorities had available to them to influence sustainability in development including

a) Special Planning Guidance.
b) The Council's current planning policy framework.
c) The developing Regional Spatial Strategy (RSS)
d) The developing Local Development Framework (LDF)
e) The Council's incorporation of sustainable approaches into the design and construction work of its property portfolio.
f) Ways of improving Council advice on sustainable design and construction.
g) Ways of raising awareness of the range of options available for sustainable design and construction
h) The communication of best practice from other local authorities and Europe
i) Provision of affordable housing and housing for an ageing population and their relationship with sustainable design and construction
j) Mechanisms for regular revisions to Supplementary Planning Guidance and related frameworks enforcing sustainability.

Planning Policy Frameworks

6. The new national planning policy framework requires the Regional Assemblies and Local Planning Authorities to conduct a sustainability appraisal of the development framework documents and adopt more sustainable approaches to planning. In brief national governments raft of new planning policy statements

Endorse;

a) The use of brown-field site and the refurbishment of existing buildings envelope as a priority.
b) Redevelopment of areas of deprivation to encourage regeneration
c) Redevelopment of town and city centres to ensure mixed usage throughout all hours

d) Increased emphasis on mixed development incorporating domiciliary, business shopping and leisure facilities, minimising reliance on transportation.
e) The integration of a greater proportion of green space within all built areas for the combined purposes of leisure and nature habitat
f) The integration of renewable energy, community energy netting and Combined Heat and Power (CHP)
g) Better management of Water to prohibit summer droughts and seasonal flooding through integrated soak-away, grey water recycling and the proper assessment of developmental impact on flood plain or natural run off areas.
h) Greater awareness of transport networking which prioritises pedestrian and cyclist access then access through well devised public transport nets

Prohibit;

a) The development of out of town shopping complexes etc
b) Development increasing reliance on private car ownership and transportation
c) Negative statements and approaches to renewable energy production

7. In view of detailed consideration of the aims of this the Members of the Planning and Transport Scrutiny Board Agreed the following Recommendations.

Provisional Recommendations

1. **Sustainability statements are required from developers clearly addressing the relationship of proposals to sustainability policies in the Local Plan.**

2. **Areas of the Local Plan should feature sustainability as a key issue, such as housing and transport, and areas appearing to contradict or undermine the sustainability policy, such as the chapter on the historic environment should be better addressed.**

3. **That Policy NE1: Trees, Woodlands and Hedgerows be strengthened so that all trees which are planted automatically have Tree Preservation Orders placed on them, on the grounds that this would ensure ongoing carbon dioxide absorption and visual screening.**

4. **That Chapter 4: Historic Environment be amended to make reference to sustainability, as protecting the historic environment and not exclude sustainable development and design as improving sustainability would contribute towards protecting historic buildings; in line with Planning Policy Statement 22.**

5. **That Policy GP5: Renewable Energy is rephrased as a positive statement in line with PPS 22 encouraging development of renewable energy facilities not a list of constraints preventing it.**

6. **Improving the use of good quality, historic buildings, including space above shops;**

7. **The provision of buildings people would want to live in, with sufficient amenity space and good quality construction work;**

8. **The preservation of green spaces and gardens, particularly in the city centre;**

9. **The avoidance of overdevelopment, particularly in terms of excessively high buildings.**

10. **That in light of part of the development at Fieldside place being overshadowed by flats built on an adjoining site greater emphasis needs to be placed in respect of maximising solar gain through all new developments. Including better assessment of the impact of future development proposals on existing build.**

11. **That the SPG includes reference to the whole life costs of buildings and limiting the footprint of buildings, for example, by extending into roof space rather than gardens and open spaces.**

8. During the course of the scrutiny Board Members also considered other mechanisms Local Authorities had used to encourage greater sustainability. These included the production of 'online and hard copy sustainable developer guides covering best practice and information about local exemplar projects, architects and suppliers promoting high sustainable design and build.

9. Based on the Sustainable Developer Guides from other LA's some amalgamated chapters of such guidance were created to inform the Boards work. These are enclosed at Annexes B-G

Provisional Recommendations

12. **That feasibility work, involving engagement with local architects to assess interest and investigation of the availability of materials for sustainable development in York, be carried out by building control.**
13. **That the City of York Council Produce its own Sustainable developers Guide using the amalgamated chapters as a starting point**

Contact details:

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Chief Officer responsible for the report:
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For more information please contact the author of the report

Background Papers and Further Reading

Title and Author(s)	**Publisher and Date**
Planning Policy Statement 22: Renewable Energy	ODPM - Crown Copyright 2004
Planning for Renewable Energy A Companion Guide to PPS22	ODPM - Crown Copyright 2004
Yorkshire and Humber Energy Policy Statement – Draft 2	Yorkshire and Humber Assembly
Securing The Future – The UK Government Sustainable Development Strategy	Crown Copyright 2005
The Sustainable Buildings Task Group report & The Sustainable Buildings Task Group report: one year on May 2004-May 2005	Department of Trade and Industry June 2004 & 2005
The Energy White Paper Volume 2 Renewable Energy Planning	TSO 2003 AEAT Report to the Government Office for Yorks and the Humber
The Sustainable and Secure Buildings Act	HMSO Crown Copyright 2004

Energy

Energy (for (add date) *or* in (Local Authority name))

Subsection of Energy Chapter. Introduction to the context national, regional and local, generally including paragraphs containing the following information;

Show present data; i.e. the % of the authority area's greenhouse gas emissions and the energy requirements of the local buildings that contribute towards this. Energy use in buildings accounts for nearly half of the UK's delivered energy consumption and over half of the UK's carbon dioxide emissions. Government Energy policy now recognises the role that energy saving and renewable energy technologies will need to play in reducing emissions of greenhouse gases and the UK's dependence upon fossil fuels.
Explaining sources of data etc

Introduce **Key objectives** i.e;

i. Strategy (climate change where applicable) /Vision/Local planning framework ensures;
   - All new developments are built to the highest standards of energy efficiency
   - Pre-existing developments are modernised and improved to achieve the new standards and targets for energy efficiency

ii. All new and an increasing number of pre-existing buildings obtain their requirements from localised renewables and efficient sources. *(insert set minimum targets with dates – may include ref to regional and national targets framework)* Target date for achieving city wide Carbon Neutrality (*where applicable see Newcastle)*

Highlight positive relationship between **prudent energy management and planning and the developer's and business communities** perspective i.e:

Reducing energy consumption and other resources during construction can result in lower direct costs for the developer, thus helping profitability. Low energy buildings not only reduce energy costs, but also improve building performance reducing damp and/or condensation; which may be expensive to remedy retrospectively and causes significant expenditure for Social Landlords. Damp has historically been a principal factor in properties remaining empty.
Lower energy buildings increase the sellability of a development, as low energy consuming homes and business incorporating renewables technologies have a marketable advantage on competitors when buildings are sold or let i.e;

- Domestic perspective: - costs of mortgage in an inflated market can be balanced against lower monthly outgoings in other areas such as utility costs. Research surveys carried out by CABE, the WWF and the Halifax (July 2004) found that 84% of people would be willing to pay an average of 2% extra on the purchase price their home if they are environmentally sound and 87% of buyers want to know if their homes are environmentally friendly (see cabe.org.uk).
- Lower running costs in business premises reduce overheads, thus supporting maintenance or improvement of net profitability.
- Landlords as potential purchasers of new developments or improvers of existing stock will be increasingly competing with the market advantage in letting low energy buildings. Already the case in the student rented sector nationally.

Highlight importance of adapting to meeting and competing in a **rapidly changing and increasingly regulated market:**

- The once small or specialist 'green' consumer market, has rapidly mainstreamed due to popularisation of the issue – programmes such as BBC2 'No Waste Like Home', newspaper and journal articles on climate change etc. This sector of the market will soon predominate and is prepared to pay a premium for buildings that have been designed to 'green' specifications and leave anything less empty.

- As the domestic market has changed businesses are developing a parallel awareness of the marketing advantages of their own business premises, practices and products having a transparent and measurable 'green image'.

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Introduce importance re **Public Sector Buildings**: Increasingly Local Authorities are aware of the consequences of high energy, the legislative framework requires much more from them to reduce energy consumption and CO_2 emissions. The public sector is inevitably choosing buildings designed to the lowest achievable energy specifications. Developers are wise to plan ahead of the legislation ensuring when legal requirements come into force they can be achieved with minimal confusion and cost.

Introduce importance re **EU Directive on Energy Performance of Buildings:** Directive 2002/91/EC of the European Parliament and Council, on the energy performance of buildings, must be adopted into UK legislation by January 2006. It will greatly affect awareness of energy use in buildings. The legislation will affect all buildings, both domestic and non-domestic.

In brief, the directive aims to improve the energy performance of buildings by requiring:

- Methodology to calculate integrated energy performance of buildings.
- The Energy certification of buildings
- Energy minimising requirements must be met in new buildings. Those buildings with a useful floor area over 1000 m2 must formally consider to the following alternative systems for heating:
  - CHP
  - District or block heating or cooling
  - Heat Pumps
  - Local energy supply based upon renewable energy
- Existing Buildings; large existing buildings being renovated must reduced energy requirements, buildings with a total useful floor area of over 1000 m^2 undergoing renovation must upgrade energy performance.
- Boilers and of air conditioning systems must be regularly inspected.
- Energy Performance Certificates: whenever a building is constructed, sold or rented out, a certificate detailing its energy performance must be made available to the prospective buyer or tenant.

Energy, the Local Economy and Community Well Being

Subsection of Energy Chapter introducing subject relations containing the following information;

Fuel Poverty: Give estimated Statistics for the (Authority/ Region) suggest (number) deaths each year related to fuel poverty. Homes built by previous decades of developers who didn't need to consider the effect of poor thermal efficiency or increasing running costs on the home occupier, or whether or not a household can afford to keep warm and cook, are a significant factor in increased likelihood of illness in their occupants.

Security of Supply: National self-sufficiency in gas is due to end in 15 years and international oil reserves are precarious, - with predictions by oil industry insiders that Oil and Gas reserves may well be reaching or have reached their peak - there are predicted rises in fuel costs across the fossil fuel spectrum . Many dwellings constructed to current Building Regulation standards will not assure the provision of affordable energy for future occupants. (*see also where applicable the Local Authority Fuel poverty Strategy & Action Plan; Hyperlink to web versions)*

Dwellings constructed to the highest standards will ensure current developers are viewed positively as rising fuel costs expose other property developers to accusations of ignoring scarce fuel supply.

Local Economy

Lowering the running costs of our local housing will lead to a net increase in local disposable income of householders, a large percentage of which will be spent in the local economy.

Reducing the running costs of our business premises, will increase profitability and the money available for expansion and job creation. Increasingly new businesses will want to locate to areas guaranteeing the best energy minimisation, local development must ensure a high competitive edge if we are to improve inward investment.

The newly mainstreamed domestic 'green' consumer is being drenched in awareness of the benefits of eco-design not only in terms of lower impact on the environment but financial benefits and quality of life. Their expectations are now beginning to exceed minimum future standards set and our local economy must rapidly adapt to meet these demands.

Being able to record that goods have been produced using sustainable energy will soon be as important a sales or marketing feature as the now common place 're-cycled', 'fair-trade' 'organic' or 'without cruelty to animals' logos. Being able to market homes as low utility users integrating renewable energy sources will be parallel to the marketing benefits of electrical goods rated high efficiency.

Forward thinking developments will raise the profile of the *(local authority area)* increasing its attractiveness to investors and new residents alike.

Low Energy Building

Subsection of Energy Chapter introducing design and build considerations incorporating the following guidance;

Minimising demand and maximising efficiency.

Future building must aim to minimise the energy consumption of business and domestic property whilst maximising the efficiency of energy usage. The relationship between buildings and the local microclimate can reduce the amount of energy required for heating. In addition buildings must be designed to incorporate maximum sourcing of their energy requirements sustainably.

In order to achieve these objectives architects, designers, planners and builders must demonstrate an understanding of micro-climate, relational positioning, spatial thermal dynamics, solar gain and renewable energy sourcing and installation.

Site Layout:

Working with Prevailing Wind Conditions and Shelter: Shelter from the wind reduces wind chill experienced around buildings, the amount of heat required to bring the internal temperature of buildings to thermal comfort and heat loss from air leakage.

To build in wind considerations and shelter principals, buildings should be;

- Orientated with the narrow end of the building to the prevailing wind (include *usual compass bearing direction based on local climatic data*) to reduce exposure.
- Spaced in open or garden settings in groups of buildings around 6 times their height apart to maximise the sheltering effect (although this must be balanced with the thermal massing benefits of higher density developments)
- Planned to incorporate the planting of shelterbelts of trees with growth attainment to the height of the building and at a distance from the building of between 1 and 3 times the height (consideration must be given to avoiding the overshadowing of passive solar elements)

- Designed to reduce the surface area exposed to cold winds; i.e. by having a low roof on the north-east side or by sheltering the exposed side by building up or partially burying with earth-banking.
- Might incorporate courtyard layouts, glazed communal courtyards and walled gardens to create interior to exterior bridge spaces and enhance external spaces.
- Influence the microclimate by using climbing plants to cover unearthed walls extending the boundary layer of warmer, less turbulent air around the building and reducing heat loss.
- Considered in respect of the installation of small to medium scale wind turbines for individual or community electrical generation.

Maximising Solar gains: Sunlight is a free, constantly renewed source of light and heat, so its benefits should be built in. Design incorporating elements to maximise passive solar gain significantly reduce the amount of heating required to achieve and maintain thermal comfort. Converting available sunlight into heat and power reduces the reliance on fossil fuel sources and increases the long-term economic viability of the building.

To build in solar gains, buildings should be;

- Orientated with the main elevation or face of the building to within 30 degrees of due South
- Spaced to ensure buildings structures, shelter break planting and high walls don't overshadow. Note, however, that the planting of native deciduous trees to reduce overheating in summer whilst minimising shadowing in winter should be considered.
- Incorporating a greater proportion of glazed areas on the southern elevations to increase passive solar gain and natural day lighting.
- Using roof lights and atriums to bring light and solar heat into the centre of buildings.
- Incorporating photovoltaic panels, cladding or roof tiles into the buildings design. For maximum efficiency, solar panels should be mounted on a south facing roof at a 30° angle with the horizontal and away from any shadows from trees, surrounding buildings or chimneys.
- Incorporating solar water heating collectors.
- Incorporating Ground Source Heat pumps; as ground source heat pumps extract sunlight energy absorbed into the earth for space heating, the energy source, strictly speaking, is solar.
- Aiming for Zero CO_2 Standard; the point at which you can obtain all your heating from passive solar gains and internal gains from the occupants.

Structure: Energy-efficient buildings minimise heat losses through the building envelope, i.e. the roof, walls, floors and windows, minimise heat losses through air leakage, whilst maximising heat and light gains from the sun.

To build energy efficient structures, buildings should be;

- Incorporating substantial roof insulation, preferably that goes beyond the building regulation minimum requirements eg. 400mm should be used in roof spaces.
- Built using dense construction materials which encourage the storage of heat and slow release over a period of time reducing the heat required to maintain thermal comfort.
- Incorporating bulk massing to high densities into the buildings fabric and through wall, floor and roof insulation using materials from sustainable sources such as wool and loose cellulose fibre from recycled newspapers, cork, and wood fibreboard.
- Using advanced solar and double glazing systems for windows and doors; preferably framed with sustainably sourced wood.
- Avoiding and eliminating the creation of thermal bridges (ie non or poorly insulated parts of the construction including areas where high conductor materials span the interior to exterior) at design. This can significantly affect the overall performance of the building.
- Minimising automatic air leakage and ensuring ventilation is controlled (condensation can be prevented in buildings with low uncontrolled air leakage by providing adequate heating and controlled ventilation).
- Designed to reduce the number of exposed external surfaces or by being compact – usually cubiform structures.

- Including deep roof overhangs to help reduce heat loss and shelter the walls from rain.
- Avoiding the need for mechanical ventilation through the use of passive stack ventilation systems, or in cases where this is not possible mechanical systems establishing 70-90% heat recovery.

Consider Including a Local Case Study Hyper Link or Exemplar Project reference:

Interior Building Layout and details: The layout of a building can significantly impact on the energy required to heat the space to thermal comfort or optimise light.

Energy efficient layouts and interior details;

- Have the lowest ratio of exposed external surfaces to internal space i.e. compact – usually cubiform structures.
- Use dense construction materials within the building and on the internal side of door, wall and roof insulation; such materials store heat and release it over time reducing the overall heat required for constant thermal comfort.
- Situate high occupancy or daytime living rooms towards the naturally lighter and warmer southern elevation of the building.
- Situate Kitchen space towards the Northerly side to reduce overheating from appliances and reliance on energy using air conditioning in summer.
- Create intermediate zone 'air lock' spaces such well sealed porches or lobbies, between the warm inside of a building and the cold outside.
- Include sunspaces such as conservatories and or glazed verandas to improve solar gain during the day. These should be constructed so that they can be thermally isolated from the rest of the building as part of the whole structures temperature regulation.
- Provide clothes drying space for natural drying internally or externally (i.e. clothes-lines, rotary clothes line in a garden and a utility room with a drying rack) to reduce reliance on energy consuming tumble driers.
- Designed incorporating individual or community biomass systems for space and water heating supplementing other onsite renewables already discussed.
- Include high standard well insulated pipework and hot water storage systems
- Include good heating and lighting controls. This may include thermostatic radiator valves and movement to light sensors in residential units to sophisticated Building Energy Management Systems in larger developments.
- Include the Installation of intelligent metering systems

Consider Including a Local Case Study Hyper Link or Exemplar Project reference:

Appliances: The efficiency of appliances used in buildings can dramatically alter the buildings energy consumption, particularly in the case of new or refurbish for sale developments consideration should be given to integrating the most efficient appliances as part of the package. This should include things like lighting systems running on only energy efficient bulbs only, high efficiency rated washing machines etc and low water use systems (taps, showers, washing machines.

Consider Including a Local Case Study – Horsman Ave, York - Hyper Link or Exemplar Project reference:

Site Size: The systems used by buildings to provide heat, cooling or power can significantly alter the occupiers main source energy requirements.

Sources of energy and how they are used, controlled and maintained, will impact upon the layout of the building and should therefore be key design considerations at an early point in the projects development.

The approach taken to single developments or modernisations may be significantly different to that of larger sites which maximise opportunities to create and connect to Community Heating Networks. Developers of larger sites should automatically show consideration proposals to develop or expand Community Heating Networks providing a highly efficient and renewable source of energy. The site layout may affect the feasibility of connecting to existing and/or proposed Community Heating Networks. Considerations should include the length of any connecting infrastructure and any potential physical barriers.

Developers working areas of mixed-use or large scale development unsuited for, or unable to connect onto, a Community Heating Network should consider installing Combined Heat and Power plant to ensure higher efficiency in fuel use.

Lighting Schemes: Developers working medium to large scale sites and smaller sites where practical should consider using solar street lighting and solar lighting for bus shelters or other similar community facilities. External lighting is an important design consideration which needs careful planning at the start of a project.

Well designed schemes for lighting benefit community safety whilst enhancing architectural and landscape features after dark, thus adding to the marketability of developments. Schemes should not contribute to light pollution and its negative impact on amenity, clarity of the night skies or wildlife, and the energy required for the lighting itself should be from renewable sources. To begin minimising the environmental impact of external lighting schemes developers should ensure:

- Lighting levels are the minimum necessary to achieve safety and enhancement objectives;
- Energy is photovoltaic or renewably sourced
- Energy efficient lamps are used;
- Uncontrolled floodlighting should be avoided and all light fittings should be shielded to minimise any light pollution;
- Particular care is taken to apply the above guidance with floodlighting schemes for sports pitches or late night shopping or leisure amenities complexes as these have historically been high light polluters and high energy consumers.

Sustainable Sourcing:

- A minimum of (x%) of a buildings energy use should be through on-site generation from renewable sources, remaining electricity requirements should be through a green tariff with an energy supply company.
- Where possible, connect to a community heating network that guarantees requirements are met from a renewable source; e.g. locally sourced biomass.

Energy Standards, Policy and Legislation

Subsection of Energy Chapter introducing policy framework containing the following information;

Local Context

The (*Local Authority)* (*add where applicable* Energy Strategy, Fuel Poverty Strategy, Climate Change Strategy, Environment Strategy) and vision place a strong emphasis on low energy design, the promotion of renewable energy and increased sustainability within the (*Local Authority)*.

The (*Local Authority)* Local Plan now (check) places requirements on most developers to demonstrate that they have fully considered the use of renewable energy technologies and the possibility of connecting to a community heating network system based upon CHP (*policy/policies???? see Appendix (X) consider Hyperlink for web based versions*). Energy efficiency issues must also be considered in the design process (*policy ???? see Appendix (X) consider Hyperlink for web based versions).*

The national legislative standards represent bare minimum requirements, core buildings regulations issued must conform to these, if a local authority wants genuine achievement equal to or beyond the bare minimum it must use it more informal powers. ***To create a high standards framework to achieve genuinely sustainable objectives Members can adopt a step programme of inquiries and actions ensuring the local authority utilises its powers of influence*** along the following lines;

Step 1. Ensuring Minimal compliance: Verify with/ask Buildings Control what methods they use to enforce the statutory minimum requirements i.e.

a. Do they spot check existing and new developments to ascertain compliance?
b. If not all, do they have a spot checking strategy with a random sample target regime of 15-25% of the total annual?
c. Has a local performance indicator for the purpose of monitoring the spot checking regime been created i.e.; authority aims (on a scale annual increasing by agreed increments over Z time frame (shorter the better if serious)) that by Y target year 100% of all developments (new and adapted) will perform to equal or above minimum statutory requirements. And that this indicator will be refreshed annually (by a part 2 if considered necessary) to ensure it absorbs any raising of the national minimum requirements.
d. Once a spot checking regime and local indicator have been established, buildings control will need to be advised of the expected reporting framework. If this is a particular issue or new issue the LA may wish quarterly reporting to Planning / Environment / other equivalent Member Boards or Panels during the first year, followed by decreasing periodicity as standards are raised.

If the Authority is not doing any of the above Member recommendations can be made to rectify this (considering improvements to resourcing as appropriate) immediately).

Step 2. Simple Actions rewarding minimal practice: Work to generate a pro-active/dynamic relationship between Buildings Control and Environmental Control and create a local 'charter mark' accreditation scheme for good practice where developments measurably comply to standards above minimum requirements: - to smooth accreditation use an automatic assessment for entry process for all developments/builds existing (using data gathered through compliance checks see 1. above) + new builds assessed on completion of build as a matter of course.

Step 3. Raising the standards: Use the Local Authorities powers to create a set of recommended local planning/buildings regulations for sustainability. These might be usefully called '**Part Y'** of the Regs for York, stipulate in Part Y the desire for compliance levels above the minimum required – perhaps with reference to the associated higher voluntary standards suggested by the BRE/ Energy Efficiency Best Practice Programme etal (see voluntary standards below). Whilst compulsory enforcement of such standards can't be immediately achieved, the adoption and publication of such local standards and regulations can be used to;

a. Feed back to the Regional Planning and Infrastructure Commission as a tool for raising the regional bench marks
b. Lobby for the adoption of 'Part Y' as a regional recommended standard; i.e. no longer just part Y for York but Part Y for Yorkshire and the Humber
c. Lobby National Government as a tool for persuading more rigorous legislated or legally enforceable standards in the near future.

Step 4. Building in Incentives to comply with Part Y: lobby the Regional Assembly/Yorkshire Forward etal to:

a. Formally recognise and adopt 'part Y' as the regional standard.
b. Introduce a framework of automatic registration and regional certification for Buildings conforming to the part Y standards – thus creating a data base of best practice exemplars by default.

c. Create an annual awards framework for the automatically registered buildings (at;b), to encourage voluntary compliance by rewarding good practice and publicising its practitioners.

Possible approach to raising issue of Part Y awards scheme. Work with the York's and Humber Assembly/ Yorkshire Forward etal (and/or equivalent bodies) to scope feasibility of a Part Y Annual Awards framework. Including the consideration of;

- *Automatic registration and certification based on details in a part Y template to be completed with applications at LA level.*
- *LA sends duplicate copy of completed Part Y submissions to central body (i.e. Yorks and Humber Assembly/Yorkshire Forward.*
- *Central body publishes completed Part Y submissions automatically on their Web site – perhaps by monthy updating regime - on a best practice data base,*
- *Website also includes Information about awards for annual round based on evaluation against submitted part Y's of final build. Site also details judging criteria, dates for next awards etc*
- *Independent judging panel convened to decide overall winners in various categories Annual Publication of outcomes from recorded Part Y builds and redevelopments*
- *Star Studded Gala Event for Regional Award Winners + Hyper Links*
- *Indication of winners on Web site as high achieving Exemplar Projects - each agreed category - from sum total of data base*

→ *Move to next awards round*

Funding requirements for the additional administration all ends etc would need to be mutually considered.

Regional context

A Regional Energy Strategy for Yorkshire and the Humber is currently being drafted. The Regional Policy Statement setting renewable energy targets for the region has been published (*see Appendix (X) consider Hyperlink for web based versions)*. The Regional Spatial Strategy incorporates an energy hierarchy highlighting the regions priorities, these are;

- Reducing the Need for Energy
- The Conservation of Energy
- The Generation of Energy from Renewable sources.

These priorities will need to be implemented through the development planning process.

National Context

The UK has committed to reducing the 1990 level of CO_2 emissions by 20% by 2010 and 60% by 2050.

The Energy White Paper '*Our energy future – creating a low carbon economy'* reminds us that whilst our demands for primary energy are still increasing our levels of self reliance on coal, gas and oil are declining and by 2020 we could be dependent on imported energy for three quarters of our total primary energy needs. The paper also suggests that the best way of maintaining energy reliability will be through energy diversity. To help us avoid over-dependence on imports, the paper suggests that by 2020 there will be;

- Much more local and community generation from sustainable sources
- Increasingly stringent efficiency standards for buildings and electrical goods
- An increasing number of Zero CO_2 Standard homes and business premises.

In January 2005 national government[1] published its Low or Zero Carbon Energy Sources – Strategic Guide (Interim Publication) outlining the principal renewables sources reliance will come to depend upon and their performance levels.

Home Energy Conservation Act
The Home Energy Conservation Act 1995 (HECA) requires local authorities to promote the improvement of the energy performance of homes in their area. A duty has been placed on Local Authorities to secure a significant improvement in domestic energy efficiency across all housing tenures. The current target is a 30% reduction on 1996 levels by 2010. The Utilities Act 2000 obliges electricity and gas suppliers to achieve energy efficiency improvements and for electricity suppliers to purchase 10% of their supplies from renewable sources.

Building Regulations
Building Regulations (and revisions including Building (Amendment) Regulations) control many aspects of the energy performance of new and refurbished buildings (including homes). The regulations set standards for heat loss through the fabric of the building. In addition, they set standards for heating, hot-water systems, the insulation of pipes and ducts and space-heating controls.

Revisions published in April 2002 increased standards for the insulation of the building fabric and introduced extra standards for reducing cold-bridging at junctions between walls, roofs, floors and windows and reducing air leakage for all buildings. There are specific requirements to improve the energy performance of internal and external lighting in homes and provide operating instructions for heating and hot-water systems. Also included for the first time is the performance of replacement boilers and windows and the requirement to improve insulation if existing buildings are being altered materially.

Revisions published in April and September 2005 require a substantial increase in the performance of central heating boilers and ventilation systems. Further revisions on the conservation of fuel and power covering both dwellings and buildings that are not dwellings and targeting improved standards for the insulation of pipes and water storage, and minimum energy performance requirements for new buildings in the form of target CO_2 emission rates, are expected in early 2006.

Standard Assessment Procedure (SAP)
It is a statutory requirement of the Building Regulations for all new dwellings to be energy rated using the Government's Standard Assessment Procedure (SAP); see also Part L of the Buildings regulations. New dwellings are assessed on a scale from 1 to 120 - a higher score indicating greater energy efficiency. Developers should consider the final energy rating at an early design stage and aim to achieve a minimum rating of above 80.

The Building Regulations are a minimum required standard and it is often in the developer's interest to exceed these standards. This can be seen as particularly advisable in respect of energy conservation and sourcing and current international concerns regarding climate change and the demise of fossil fuels.

Planning
Revisions to the Planning Policy Statement 22 on Renewable Energy now make clear that the wider benefits of renewable energy developments are material considerations in planning decisions.

European Context
EU Directive on Energy Performance of Buildings
Directive 2002/91/EC of the European Parliament and Council, on the energy performance of buildings, came into force on 4 January 2003 and must be adopted into UK legislation by January

[1] Office of The Deputy Prime Minister

2006. It will greatly affect awareness of energy use in buildings. The legislation will affect all buildings, both domestic and non-domestic.
The directive aims to improve the energy performance of buildings by requiring:

- a methodology to calculate integrated energy performance of buildings
- minimum energy requirements for new buildings
- minimum energy requirements for large existing buildings being renovated
- energy certification of buildings, and the regular inspection of boilers and of air conditioning systems.

All new buildings must meet the minimum energy performance requirements. For those with a useful floor area over 1000 m2 governments must ensure that, before construction starts, formal consideration is given to the following alternative systems for heating:

- CHP
- district or block heating or cooling
- heat pumps
- decentralised energy supply based upon renewable energy.

Governments must ensure that, whenever an existing building with a total useful floor area of over 1000 m^2 undergoes major renovation, its energy performance is upgraded

Energy Performance Certificates

The directive also states that when a building is constructed, sold or rented out, a certificate detailing its energy performance must be made available. This can either be to the owner or, by the owner, to the prospective buyer or tenant.

EC regulation 2037/2000

Developers, buildings owners and facilities managers must be made aware of the implications of the EC regulations on refrigerants, and the procurement of new, and the maintenance and servicing routines for exiting refrigeration and air conditioning systems.

EC regulation 2037/2000 bans the use of:

- CFCs for the maintenance or servicing of refrigerating and air conditioning systems
- HCFCs in most new refrigeration and air conditioning systems manufactured after 2001
- new HCFCs for maintaining/servicing existing systems from 2010, with a total ban on all HCFCs from 2015.

International Context

By becoming a signatory nation of the 1997 Kyoto Protocol the UK has signed up to a legally binding target of reducing greenhouse gases as a whole by 12.5% by 2008-12. In line with the advice of the Intergovernmental Panel on Climate Change (IPCC) the UK must aim for a reduction of 60% in CO_2 emissions by 2050.

It will be impossible to achieve such targets without developer maximising the integration of energy from local renewable sources where ever possible**.** This might include solar space and water heating, solar electricity generation (photovoltaics), wind power, biomass fuel and other sources of energy.

Voluntary Standards

In addition to all the legislative standards there are also some voluntary standards which developers are increasingly choosing to meet.

National Home Energy Rating (NHER)

The NHER assesses the energy efficiency of a dwelling based on a wider range of issues than Standard Assessment Procedure (SAP) ratings. These include orientation, location, altitude, size, fuel type, heating and hot water system and household appliances. A scale of 0 to 10 is used, with a higher score indicating a more energy efficient home. (A score of 7 should be considered as a minimum to borderline outcome as this only conforms to the Building Regulations at 2005)

The Energy Efficiency Best Practice Programme is more rigorous, and offers a set of standards for sustainable homes, these include;

- **Zero CO_2 Standard**. When energy demand is reduced as far as possible and you have replaced as much fossil-fuel use as possible with renewable energy, you may be able to create a 'zero CO_2' development. This may be achieved by buying electricity on a 'green' tariff from a company supplying renewable energy. If you use any non-renewable energy - eg, gas for cooking, you will need your own renewable electricity-generation capacity large enough to export sufficient power to the grid in any year to compensate for the CO_2 emissions associated with importing non-renewable energy.
- **Zero Heating Standard**. If, in addition to the Zero CO_2 Standard, you can obtain all your heating from passive solar gains and internal gains from the occupants, then you will have achieved the higher 'zero heating 'standard.
- **Autonomous Standard**. If, in addition to the Zero Heating Standard, you can obtain all your services from on-site resources, then you will have achieved an 'autonomous' standard. A grid-linked electricity system can be used as long as it is a net exporter rather than user of power.

Recognised voluntary standards above minimum or readily achievable compliance may be used in respect of work with the Yorks and Humber Assembly (and/or equivalent bodies) to establish a framework for adoption of Part Y + annual awards for Developments,. Including the consideration of;

- *Automatic registration and certification based on spec.*
- *Published Information about awards for annual round based on evaluation against spec of final build, details of judging criteria, candidate development and build profiles + Hyper Links*
- *Publication of Outcomes & Event for Regional Award Winners + Hyper Links*
- *Indication of winners as high achieving Exemplar Projects from sum total of data base*

→ *Move to next awards round*

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Water

Water (for (add date) *or* in (Local Authority name))

Subsection of the Water Chapter. Introduction of the context national, regional and local generally including paragraphs containing the following information;

Show present data; i.e. (Local Authority name) (Insert as applicable) Climate Change Strategy, Vision, Emergency Plan emphasises that the (Local Authority name) should expect and prepare for drier hotter summers and warmer, wetter winters as a result of global warming.

The UK Climate Impacts Programme (UKCIP) anticipates that global warming will lead to significant changes in rainfall distribution and intensity, with UK properties likely to suffer in the future from water shortages or flood damage. The design, capacity and maintenance of our urban drainage systems may require upgrading in order to accommodate greater storm activity. The impact of on this region has already been felt and our community must work to prepare for an increased propensity to flooding - such as that of 2000 - and the flash flood events of June 2005.

Demand for water (nationally/locally/) has (more than doubled since 1970, /local stats if available) leading to stresses on water supply, treatment and disposal. Rising consumption levels are placing increasing pressure on river, groundwater, flood meadow and other wetland ecosystems. It is therefore important that all new developments are designed to work in harmony with and minimise their impact upon the water environment.
Explaining sources of data etc

Introduce **Key objectives** i.e;
Strategy (climate change where applicable) /Vision/Local planning framework ensures that;

- All new developments are built to high levels of water use minimisation and incorporate and develop flood risk minimisation techniques such as the adoption of soft or permeable landscaping and the incorporation of soak away systems.
- Pre-existing developments are modernised to improve water monitoring, decrease demands on supply and reduce the proportion of hard landscaping.

Highlighting positive relationship between **prudent water management and planning and the developer's and business communities** perspective i.e:
Reducing energy consumption and other resources during construction can result in lower direct costs for the developer, thus helping profitability.

- Increasing a developments sellability is related to the efficiency of the utilities used, building in lower water consumption presents a marketable advantage on competitors when buildings are sold or let.
- Domestic perspective: - costs of mortgage in an inflated market can be balanced against lower outgoings on potable (drinking) water and treatment costs. Research surveys carried out by CABE, the WWF and the Halifax (July 2004) found that 84% of people would be willing to pay an average of 2% extra on the purchase price their home if they are environmentally sound and 87% of buyers want to know if their homes are environmentally friendly (see cabe.org.uk).

- Lower running costs in business premises reduce overheads, thus supporting maintenance or improvement of net profitability.
- Landlords as potential purchasers of new developments or improvers of existing stock will be increasingly competing with the market advantage in letting low water consuming buildings. Already the case in the student rented sector nationally.

Highlight importance of adapting to meeting and competing in a **rapidly changing and increasingly regulated market:**

- The once small or specialist 'green' consumer market, has rapidly mainstreamed due to popularisation of the issue – programmes such as BBC2 'No Waste Like Home'. This sector of the market will soon predominate and is prepared to pay a premium for buildings that have been designed to 'green' specifications and leave anything less empty.

- As the domestic market has changed businesses are developing a parallel awareness of the marketing advantages of their own business premises, practices and products having a transparent and measurable 'green image'.

Introduce importance re **Public Sector Buildings**: Increasingly Local Authorities are aware of the consequences of high water consumption and poor water management, the legislative framework is changing to incorporate the metering and monitoring of water use and consumption. The public sector is inevitably choosing buildings designed to achieve lower levels of water consumption. Developers are wise to plan ahead of the legislation ensuring when legal requirements come into force they can be achieved with minimal confusion and cost.

Water, the Local Economy and Community Well Being

Subsection of Water Chapter introducing subject relations containing the following information;

The main areas developers must consider in relation to the water are increasing sustainable water use and the management of flood risk. The development or refurbishment of buildings provides an ideal low cost opportunity to incorporate these measures.

Flood Risk

Properties with lower risks associated to flooding are inevitably easier to sell or let than those with higher risks. Insurance companies routinely use flood risk information - provided by the Environment Agency - to assess appropriate premiums for building insurance, this has significantly increased premiums for properties within flood risk areas. The Association of British Insurers has warned that buildings knowingly constructed in areas at risk of flooding may not be insurable.

In addition, owners may find that they can become liable for flooding elsewhere if it is found that the root cause is a problem with drainage on their site. Sustainable building solutions can help to significantly reduce flood risk and the associated litigation and insurance costs associated with the development..

Developing a proven track record on the implementation of the change to Part H of the Building Regulations in the developers best interest. Delivering standards above those of the regulations now makes good business sense for developers, so that

once higher standards become a legal requirement they can be achieved with minimal confusion and cost.

Dwellings constructed to the highest standards will ensure current developers are viewed positively when flooding events expose others to accusations of increasing the risks. Our society is increasingly litigious and whilst currently there are few precedents for such action, it is not unimaginable that future individuals and organisations will hold developers and planners to account to account for the property damage and injury related to such incidents.

Local Economy

Lowering the running costs of our local housing will lead to a net increase in local disposable income of householders, a large percentage of which will be spent in the local economy.

Reducing the running costs of our business premises, will increase profitability and the money available for expansion and job creation. Increasingly new businesses will want to locate to areas guaranteeing the best water use minimisation and management plans and achieving high standards of flood damage prevention, local development must ensure a high competitive edge if we are to improve inward investment.

The newly mainstreamed domestic 'green' consumer is being drenched in awareness of the benefits of eco-design, not only in terms of lower impact on the environment but financial benefits and quality of life. Their expectations are now beginning to exceed minimum future standards set and our local economy must rapidly adapt to meet these demands.

Domestic water consumption accounts for around 65% of the UK total yet relatively straightforward water-efficiency measures could reduce this requirement by up to 50%. The price of water has risen steeply over the last decade and is now a significant expense for many households and businesses.

Being able to market buildings as low water utility users - integrating low use fittings, rainfall capture, recycling systems and community sewerage networks – is essential to future economic health.

Forward thinking developments will also raise the profile of the *(local authority area)* increasing its attractiveness to investors and new residents alike.

Water: Flood Risk

Q. Does the Local Authority have a Strategic Flood Risk Assessment for the (City/LA area) to gauge which areas are most at risk *(if so say so then point out that)*. Any developments within an identified area of risk will have to consider how the risk can be reduced through mitigation or other measures.

New developments outside these areas are also required to reduce flood risk elsewhere by incorporating a range of other measures such as sustainable drainage systems (SUDS). SUDS can have other benefits such as contributing towards the aesthetic and recreational quality of landscaping schemes through the introduction of water features and areas of high wildlife value.

Developers must ensure the development is not at risk from flooding by finding out at an early stage if the development is in a flood risk area. This can be achieved by contacting the Environment Agency.

Measures must always be incorporated into the design of developments to address any flood risk (to satisfy the EA and ensure that it is insurable). In large areas of development plans should incorporate as a minimum measure the provision of new flood plain to compensate for the area lost and ensure that other buildings are not put at greater risk.

Consider Including a Local Case Study Hyper Link or Exemplar Project reference:

Water & Building

Subsection of Water Chapter introducing design and build considerations incorporating the following guidance;

Minimising demand maximising efficiency and flood prevention.

Future building must aim to minimise the water consumption of business and domestic property whilst maximising the efficiency of its usage. The relationship between buildings and the local environment can reduce the amount of mains water required for all purposes, improve living and working conditions and protect our natural and built environment from harm.

In order to achieve these objectives architects, designers, planners and builders must demonstrate an understanding of local weather and topographic conditions, the availability of new cost-effective systems for recycling water, curbing its use and treating waste-water, and methods for minimising and replacing hard-surfacing of large areas with soft landscaping alternatives.

Site Layout:

Working with the Landscape: All developments and existing built environments offer opportunities for better water management and developers need to assess sites to maximise the potential of their approach.

To build in good water management principals, developments should be;

- Working in more natural methods of treating sewage. In larger, self-contained schemes these include the use of reed bed or wetland sewage treatment which can also double up as an attractive wildlife habitat and enhance the appearance of the built environment. Such approaches have already been adopted in many new developments in the UK and proven to be effective. The use of such a system at the Millennium Dome in Greenwich has helped to raise the public profile.
- Avoid hard-surfacing of large areas in favour of soft landscaping (e.g. grass or porous paving) which slows the rate of run-off to watercourses. Consider planting on flat roofed areas ('green roofs') if rainwater is not collected for re-use.
- Adopting planned systems of sustainable drainage (SUDs) for surface water drainage. SUDs, slow the rate of flow is (through filter strips, swales, and soakaways). This prevents flooding and erosion and spreads peak flows over a longer period. SUDs also filter out some pollutants (e.g. intercepting oil) and

may provide a local water amenity (e.g. balancing ponds) increasing biodiversity on the site.
- Ensuring that communal green space avoids plants requiring large amounts of water, incorporates dense ground cover to avoid evaporation and includes plans for the mulching of plants at the start of summer to help retain moisture.

Maximising rainfall gains: rain is a free, constantly renewed source of water, so its benefits should be built in. Design incorporating elements to capture rainwater significantly reduce the amount of water from metered sources required for domestic and business activities. Converting available rainwater into usable water reduces the reliance on our fragile water supply and increases the long-term economic viability of the building.
To build in rainfall gains, buildings should be;
- Ensuring rainwater collection can be undertaken at different levels of cost, complexity and saving, as per the hierarchy below:
  - Minimum standard: Incorporation of a rainwater collection system with water butts into all homes and other developments with outside water requirements such as watering landscaped areas.
  - Medium standard: Incorporation of a rainwater collection system for flushing the toilet or for use in the washing machine; requires storage in tanks and filtering.
  - High standard: Incorporation of a rainwater collection system for drinking and cooking requires filtering and purification (systems should aim to avoid reliance on chemicals).

Structure: Water-efficient buildings minimise reliance on mains supply and treatment, whilst maximising gains from rainfall and recycling, and incorporating elements to alleviate flooding.

To build water efficient structures, buildings should be;
- Incorporating substantial rainfall collection systems (see above)
- Incorporating neighbourhood treatment through new technologies such as solar aquatic treatment or 'Living Machines'
- Buildings should be designed to allow recycling of 'grey' water (usually from bath, shower and washbasins) for flushing toilets or for assisting plant growth and other low quality uses.
- Considering construction techniques such as green roofs, which slow the discharge of water into the drainage system. Green roofs may also improve the thermal efficiency of a building and support the natural environment.
- Incorporating garages and storage for garden equipment into the buildings footprint or structure eliminating the building of additional hard structures.
- Avoiding the incorporation of features encouraging the use mains supplies, for hoses or sprinklers

Consider Including a Local Case Study Hyper Link or Exemplar Project reference:

Interior Building Layout and details: The layout of a building can significantly impact on the way in which water is used.

To build water efficient layouts;
- Buildings should be designed to allow recycling of 'grey' water (usually from bath, shower and washbasins); generally for flushing toilets or for assisting plant growth and other low quality uses.
- Buildings should be designed to allow for the use of composting toilets and waterless urinals.

- Water meters for both potable water and sewerage should be installed wherever possible as real water savings can be achieved when occupiers pay for what they use. Ensure these are installed correctly and regularly serviced.
- Water management systems detecting exceptional usage caused by leaking pipe-work or other faults and enabling the effective monitoring of general usage should be installed.
- To eliminate the running of taps for a long time before they receive hot water low-water use fittings should be installed as near to the hot-water source as possible.
- Buildings should be designed to encourage the use of showers (not power showers) in preference to baths.

Consider Including a Local Case Study Hyper Link or Exemplar Project reference:

Appliances: The efficiency of appliances used in buildings can dramatically alter the buildings water consumption, particularly in the case of new or refurbish for sale developments, consideration should be given to integrating the most efficient appliances as part of the development package. This should include things like;

- As a target measure install composting toilets and waterless urinals - these use no water and should not smell.
- or as a medium measure install measure dual-flush or low-flush toilets that can reduce water use by up to 20%.
- as a minimum measure install water displacement devices in older cisterns to reduce capacity.
- Always install showers (except for 'power showers') which are more efficient than baths; using a third of the water.
- Spray taps for washbasins - they can save 80% of water use.
- Install Low-water use fittings which should be as near to the hot-water source as possible to reduce 'dead legs' and the consequent waste from running the hot tap until it gives hot water.
- Install water-efficient washing machines (both domestic and industrial) and dishwashers.

Consider Including a Local Case Study – St Nicholas Field Environmental Community Centre, York? - Hyper Link or Exemplar Project reference:

Site Size: The systems used by buildings to provide water for all purposes and treat sewerage can significantly alter the occupiers main source water requirements.

Sources of water for drinking and non-potable purposes and how they are used, controlled and maintained, will impact upon the layout of the building and should therefore be key design considerations at an early point in the projects development.

The approach taken to single developments or modernisations may be significantly different to that of larger sites which maximise opportunities to create and connect to Community Sewerage and Water Treatment Networks.

Developers of larger sites should automatically show consideration proposals to develop or expand Community Sewerage and Water Treatment Networks providing an efficient and safe source of water. The site layout may affect the feasibility of creating such systems. Considerations should include the length and capacity of any connecting infrastructure and any potential physical barriers.

Developers working areas of mixed-use or large scale development unsuited for, or unable to develop Community Sewerage and Water Treatment Networks should consider developing neighbourhood or local treatment through new technologies such as solar aquatic treatment or 'Living Machines'.

Water Standards, Policy and Legislation

Subsection of Water Chapter introducing policy framework containing the following information;

Question: How can you evidence that - The (Local Authority) is committed to ensuring present and future demands for water, are met more effectively. In doing so, the (Local Authority), will endeavour to;

- reduce the threat of flooding, and minimise the effects of flooding
- decrease incidences of water pollution endangering wildlife and public supply
- Mitigate against water shortage. By endeavouring to increase the availability of new cost-effective systems for recycling water, curbing its use and treating waste-water
- Insure materials specification and of on-site construction practices respect the vulnerability of all watercourses, aquifers and environmentally sensitive areas.
- Encourage the widespread adoption of metering and not oppose the increased cost of water supply and treatment where these can be justified.
- Back stringent Regional, National and EU policies/legislation to reduce water use, pollution and flood risk.

The Local Context

Does the (Local Authority Name) Local Plan reflect national and regional policies in seeking to ensure that new developments minimise their impact on the water environment and do not create a flood risk problem.
Has a Strategic Flood Risk Assessment has been carried out for the Local Authority Area that takes into account the impact of climate change on the flood risk area? This information should be used to guide planning decisions.

To create a high standards framework to achieve genuinely sustainable objectives Members could adopt the step programme of inquiries and actions detailed at this point in the Energy Chapter

The Regional Context

Check that Environment Agency has produced a regional water resources strategy to guide the management of resource over the next (XX) years.

Refer to the Regional priorities for water resource management set out in the Environment Agency Regional Strategy (*cite the publication title and date* consider with web based versions providing a hyperlink or embedding an adobe document if permissions/format allow).

Provide a one-two paragraph synopsis of the content.

Check that The draft Regional Planning Guidance for Yorkshire and the Humber (ref) places a priority on water conservation and flooding issues in recognition of the

increasing pressures on water resources and the implications of climate change. Check which Policy Statements (ref) outline the approach to be taken with the water environment and sets out the regional approach to managing flood risk (Policy ref), *Include a sentence about the requirements imposed* i.e. sustainable drainage systems to be designed into all new developments where practicable.

The National Context

Policy changes and legislation enacting the objectives of the EU Water Framework Directive in the UK represent the core legislation in this area(see European Context below).
In the **'UK Government Sustainable Development Strategy – Securing the Future'** a clear intention to move quickly to enforcing higher economic contributions from all those who use, and also those who may pollute water is signalled. It may be implied that the day of compulsory 'pay for impact' metering of mains water, waste and sewerage is not far off and developers would be wise to install metered systems in readiness.
Recent revision of the Building Regulations will control the use of water for the first time.
Planning Policy Guidance note on Flood Risk and Planning (PPG25) explains how flood risk should be considered at all stages of the planning and development process. The guidance makes clear that the susceptibility of land to flooding is a material planning consideration and that the Environment Agency has the lead role in providing advice on flood issues.

The European Context

The European **Water Framework Directive -** Water Environment (Water Framework Directive) (England and Wales) Regulations 2003 - is the most important piece of water legislation from the EC to date and sets a framework which should provide substantial benefits for the long term sustainable management of water. This legislation requires that;

- All inland and coastal waters to reach at least "good status" by 2015.
- River basins are managed holistically to deliver good ground and surface water outcomes; river basin management plans are published by 2009
- Ecological targets for surface waters are met.

Voluntary Standards

More work needed to establish the terms of voluntary standards (EcoHouse etc), encouraging adoption of measures beyond those required, introduce these here. .

Buildings – Adaptability, Durability and Materials

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter'. Introduction to the context national, regional and local, generally including paragraphs containing the following information;

Decisions regarding the use of materials have wide reaching environmental consequences, energy used in the manufacture, delivery, and the incorporation of materials and appliances into buildings accounts for some 10% of total energy consumption in the UK alone. Choices developers make in sourcing materials impact upon globally finite resources such as minerals, and fossil fuels. Upward of 250 million tonnes of material are extracted from quarries each year for cement bricks and aggregates.

In addition, the construction industry uses many other materials and components, which all have a range of effects on the environment arising from their production, use, maintenance and final disposal. The construction industry in the UK is estimated to use six tonnes of building materials per person each year in developments; 20% on infrastructure (civil engineering) and 80% on buildings.

Approximately 50% of total CFC's produced have been through uses such as air conditioning, refrigeration, fire extinguishers and insulation in buildings (Blowers, 1993). Poorly evaluated industrial practices, building techniques, waste disposal, and transportation have led to ground, air and water pollution so hazardous to life that we are now having to invest millions in time and costs to reclaim a fit environment for ourselves and future generations. Approaches to building must change.

To reduce the energy used, chemicals required and emitted during the mining, manufacture, finishing and transportation of building materials and development we must adopt a holistically sustainable approach to;

- Pre-build site analysis, records and planning
- Pre-build land reparation and risk mitigation planning
- Pre-demolition salvage, recycling and waste and pollutant management
- Re-use and adaptation of existing builds
- The accurate specification and quantity surveying of materials.
- The sustainability of sourcing and storing materials
- The resilience or durability of materials used and their suitability to re-use or recycling
- The effectiveness of maintenance plans and contracts

The **Sustainable Buildings Task Group Report: one year on** to National Government makes it clear that building control and planning officers will be increasing required to assess future development plans and final builds to ensure that sustainability issues have been fully addressed throughout the project. Developers, must begin to understand and utilise the range of tools available for assessing the overall impact of development and buildings performance and, be prepared to declare the chosen assessment tools and outcomes used in their designs and development plans. The Building Research Establishment (BRE) tool BREEAM has been recommended by the Sustainable Buildings Task Group (SBTG) as the basis for assessment arrangements for the finally adopted code.

Site Approaches

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter'. Introducing pre-development considerations.

Sustainable principles and approaches should be established at the outset of the design development process to mitigate against pollution, maximise recycling potentials and ensure long term durability of builds. A pre-demolition, pre-development site appraisal and plan should be completed from the outset to establish the proper approach to sustainable value management and contracting. Such sustainable plans and approaches established at site assessment point are far easier to continue through the construction and commissioning of the building and final maintenance contracts.

Site appraisals should map a site's biodiversity, microclimate and topography, including features above and below ground (such as archaeology, minerals and water), its existing structures, location, access and egress routes, its relationship to the neighbouring environment and community.

Topographic and Bio Features:

A sustainable pre-demolition, pre-development site appraisal and plan should evidence;

- An awareness of ground stability and structure, noting such features as deep plastic clay beds, shales, previous undermining and minerals extraction or other features increasing likelihood of subsidence and implying the need for specialist approaches to foundations. Noted subsidence risk features can then be used to ensure foundations and utilities infrastructure are designed to mitigate against high cost future maintenance or at worst case scenario destabilising leading to demolition.
- Early evaluation of ground substrate properties in consultation with a qualified adviser establishing necessary excavation levels to reduce unnecessary levels of concrete in foundations and floors.
- Consideration of the hydraulic status quo. Including the value of the soils and substrate to the maintenance of stable/usual year round water tables and the likely impact of alteration in the development area to this. The existing pattern of surface water drainage and the existing pattern and courses of natural substrate drainage should also be recorded. Noted hydraulic features can then be used to ensure the incorporation of alternate flood plain and the planned;
    - mitigation of pollution of natural water courses during and post demolition and build (see also water chapter)
    - approach taken to incorporating sustainable drainage systems (SUDS) and soft landscaping and soak away flash flood reduction features. (see also water chapter)
- Consideration of asset bio-features such as trees established hedge rows and scarce native species. Noted bio-features should be maintained wherever possible and the development planned to incorporate them by avoiding damage to roots and aerial parts. Site access for development and building foundations should be designed to reflect impact distances from bio-features.
- Quantity surveying should be included at an early stage to establish volumes of build materials including topsoil and subsoil already on site and plans made for the on-site storage of these for landscaping later, thus minimising adverse impacts on soil resources and wasted transportation

Environmental Reparation: Our understanding of bio-hazards and appropriate waste disposal has significantly improved, today's developers may however inherit site conditions evidencing past insensitivity to such issues. A sustainable pre-demolition, pre-development site appraisal and plan should evidence an evaluation of the need to cleanse soils of any toxicity and safely remove any hazardous materials present, such as asbestos. See also **Land remediation tax relief** in the 'Standards, Policy and Legislation' section of this chapter.

Built Site Context: As well as ensuring that developments preserve bio-features and do not detrimentally impact on their natural surroundings, a sustainable pre-development site appraisal and plan should evidence;

- Understanding of how the development can link with, expand or create sustainable utilities infrastructure i.e.
  - Community renewables heating and lighting networks (see the Energy Chapter)
  - Community reed bed, wetland or other sustainable sewage treatment networks and, planned systems of sustainable drainage (SUDs) (see the Water Chapter)

- Understanding of how the development can link with, expand or create sustainable transport infrastructure (especially transport links, to schools, hospitals, and so on) i.e.
  - Enter consultation with bus companies regarding likely future needs and how these can be incorporated and enhanced (see the Transport chapter)
  - Plan in cycle lanes and storage (see the Transport chapter)
  - Expand off road pedestrian routes and cuts as well as pavements (see the Transport chapter)

- Understanding of how the development can maintain or enhance the character of the existing buildings (see also Historic Environment Chapter). Where priority should be given to;
  - Renovation and reuse of architecturally significant structures in previously developed sites.
  - The high use of legally reclaimed building materials of a type blending with the existing architecture

- Understanding of how the development can incorporate the need for open space and leisure serving the broader community interest (see also Land Use and Open Space Chapter)

- Understanding of how the development can expand and blend the natural environment into the built environment in the interests of wildlife and bio-diversity (see also Wildlife and Bio-diversity Chapter)

Sustainable Demolition: Between 70 and 80% of building construction materials are derived from natural resources such as stone, timber and clay. Given this, developers need to reject historically adopted rapid demolition and clearance approaches in favour of adopting deconstruction principals maximising the potential for materials to be reclaimed for reuse and recycling. Where the contracted party for demolition is separate from the contracted party for construction, the contracts should clearly indicate the joint and separate responsibilities for sustainable development issues such as pollution, waste management, sourcing etc.

A sustainable pre-demolition, pre-development site appraisal and plan should evidence;

- The application of quantity surveying to the understanding of the volumes of onsite pre-demolition materials and their potential for re-use and recycling in order to;

  - Develop appropriate on site separation and secure (from natural elements and human beings) storage facilities for reclaimed materials for re-use and recycling.
  - Develop appropriate on site cleaning and refinishing facilities for reclaimed materials for re-use and recycling which do not pollute ground water or soil.
  - Assess what of the total volume of the separated materials under all categories will be reused on site to minimise overestimation of quantities of new materials and associated environmental impacts through transportation and waste.

- Enter into effective contracts with other local developers/buildings suppliers for the removal of volumes of the separated materials not required under all categories for use elsewhere.
- Minimise the volumes of new materials required and their associated transportation impacts.
- Develop a waste minimisation plan emphasising recycling and reuse and minimising landfill which will then continue to operate throughout construction.

- An understanding of the differing reclamation methods required for differing materials to ensure greatest salvage gains and reusable condition. For example;
  - Reusable bricks, masonry stone and slates need to be removed by hand, cleaned if possible at site and stored on pallets to avoid damage and ease handling.
  - Timber flooring, roof beams, doors, door frames and window frames panelling and shuttering need to be carefully hand removed and freed of screws and nails – both for health and safety reasons and to ease reuse. All sound timber products should be stacked or stored in conditions mitigating against damage from weather.
  - Ceramic (i.e. sinks, baths and toilets, period tiles), metal (fire surrounds etc) need careful hand removal and storage if they are to be kept in re-use condition.

- An understanding of the recycling opportunities and methods presented by materials that are not of adequate standards for re-use. For example;
  - Where the site conditions permit, separate crush and pack rubbles and hardcore, for use in order of preference;
    - on site (low quality aggregate uses bedding paving, roads, etc)
    - on other sites where crushing will save on excess transport
  - Separate timber which can't be reused into treatment contaminated product and non-contaminated product, shred and store the latter for later use as mulch around landscaping features. Check whether the former can be used in large scale local waste to fuel or bio-mass burning plants before sending to landfill.
  - Separate glass for recycling, where the site conditions permit and health and safety considerations allow, crush and pack to minimise transportation.
  - Separate metal products for recycling

- An understanding of waste reduction targets setting with the aim of minimising waste production throughout the phases of each development project. Waste arising during construction should be estimated within agreed targets then measured and compared with established benchmarks (for example the BRE SMARTWaste web-based tool) and where the demolition is a sub-contract of the developers contract the primary contractor should consider the feasibility of penalty clauses for the creation of waste exceeding targets within an agreed % excess.

Adaptability and Durability in Design

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter' covering the core concepts in respect of new developments and refurbishment or redevelopment of existing structures.

In York and the region we are proud inheritors of a long history of inhabitation, amongst our buildings are structures of significance from the Roman period through to our recent industrial past. Successful cities adapt as their economic bases change and the demand for housing and the nature of workplaces alter. Sustainability is about improving quality of life today in a manner respecting the needs of future generations. Development must preserve this heritage whilst creating an equally significant and dynamic inheritance for generations in buildings constructed today.

Flexibility: To secure sustainability development must build-in adaptability, durability and flexibility to both its existing and new buildings. Buildings are more likely to be occupied and re-used if they can be easily adapted to meet changing needs. The developer should remember that flexible builds;

- Attract a greater range of potential purchasers or tenants ensuring the best sale, or rental values and minimise vacancy time and under occupation.
- Increase the sell-on or re-let value of a building.

Whilst the approaches taken alter subtly at the detailed level to the refurbishment or redevelopment of existing build and new build, certain key principals can be applied to both. First steps are about maximising flexibility across a spectrum of changing needs.

Contractors and developers should be able to evidence flexible approaches to building and renovation at point of application, these should;

- incorporate possible mixed uses within a building, or complex of buildings such as living accommodation above shops particularly larger development areas.
- allow for adaptation of the space to accommodate for the growing home working market. Particularly domestic property, but also a useful indicator of the need to be able to adapt industrial and office space to domestic or multi-purpose use later.
- incorporate readily adaptive space layouts;
    - including expansion space such as basements or lofts made thermally efficient and damp proof at point of build, refurbishment or renovation for ease future use.
    - built forms that incorporate easily accessible and changeable utilities installations.
    - flexible spaces for changing spatial requirements of building occupiers, including consideration of the merits of non-structural or frame internal walls.
- Improve or maximise the buildings internal and external accessibility without resorting to mechanical aids such as lifts wherever possible. This will mean best use of: gradients, accessible routes, entrance position, level changes, ramps, and the planning of internal disability access features etc.

Reuse: Many abandoned industrial buildings and disused churches are now being refurbished as domestic and business premises. The re-use of existing buildings that do, or could, positively contribution towards the local environment is of primary importance. The majority of buildings can, with investment, be adapted to meet present and future needs. Where buildings are structurally sound and do not present another environmental hazard demolition should not be considered.

The re-use and adaptation of existing buildings represents high sustainable advantages by;

- Reducing the demand for and associated environmental impacts of new building materials
- Reducing the environmental impacts of the construction process
- Promoting a sense of place and historic and cultural continuity.
- Providing the opportunity to upgrade insulation, heating, lighting and ventilation efficiency standards
- Providing the opportunity to adapt previously unusable space – i.e. basements and lofts – to habitable standards.

- Providing the opportunity to modify access – particularly of internal spaces – to disability aware standards

Whilst the re-use and adaptation of existing buildings represents high sustainable value it must be ensured that adaptations respect;

- Important aspects of the building that have historical or cultural importance or are protected by listed building status. When restoring listed buildings or working in conservation areas the effect should be in keeping with the original designs.
- The increased need for visible materials to blend with their surroundings. The use of traditional local materials particularly if recycled can ensure the building respects its surroundings whilst also encouraging the of local materials and reducing the need for transportation.
- The need to conform with planning and building regulations for any change of use.
- The need to remove any hazardous materials present, such as leaded paints or asbestos.

New Developments: Whilst adhering to all the principals for future flexibility and being sensitive of the conservation areas, new builds should be designed to;

- Ensure high structural standards facilitating a long and useful life avoiding premature obsolescence and dereliction.
- Incorporate flexible layouts that allow for the greatest variety of possible future adaptations and uses can be accommodated
- Include adaptable storage minimising the need for future expansion of the built area; including the consideration of basement garages.
- Include basements insulated, ventilated and damp proofed to allow for future expansion of the liveable area. Consider the following points;
    - 'partial depth' basements provide for better natural lighting, ventilation and damp-proofing than conventional basements;
    - providing a basement can enable more efficient use of individual plots, but should be carefully designed to avoid the creation of substandard living accommodation;
    - basements can provide a substructure that is less susceptible to frost heave, settlement and moisture changes in the subsoil.
- Favour pitched roofs over flat roofs for the following advantages:
    - less maintenance is usually required
    - they provide more ready locations for solar panels (see energy chapter)
    - Additional rooms can be readily created in the space provided if trussed rafters are avoided and careful consideration is used in the choice of roof insulation.
- Make extensive use of recycled and renewable construction materials and techniques.

All Developments:

- Should be designed to incorporate as far as possible the sustainable approaches to resource management covered in the Energy, Water and Waste Chapters.
- Provide for convenient and secure cycle storage whether commercial or domestic buildings
- Provide storage areas for separating containers for recyclable materials.

Sourcing Materials & Construction

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter'

This section builds on and the sustainable approaches introduced in previous sections of this chapter to ensure they can be carried through the next phases, to recap;

- Establish pre-demolition or pre-build site evaluation and management reports and plans.
- Adopt deconstruction approaches to demolition maximising recovery, recycling and re-use.
- Re-use existing structures over new build as a priority.
- Design both new and re-used structures for adaptability and environmental efficiency.

By point of materials sourcing and construction it would be assumed that the Build/Project Manager and site have organised to;

- Provide easy access to appropriately separated and stored recovered materials from demolition for re-use.
- Ensure that the volumes of such materials have been deducted from the quantity surveying calculations for total materials required; much construction waste could be avoided by carefully calculating the quantities of materials required.
- Have unneeded reclaimed and recyclable materials moved to another site or supplier to minimise damage.
- Established a waste management area for the continued separation of recycle, re-use materials throughout the build
- Consulted on and entered agreements for expanding or creating sustainable and renewable utilities infrastructure.

Some long-lived or durable materials require significant amounts of energy to produce but the final product may require little maintenance and be simply re-used without significant further energy, water or processing being required. Other reasonably available materials may degrade in such a way as to emit harmful substances into the environment or require significant processing to render safe as waste, and/or not contribute significantly to landfill at the end of their useful life.

By point of materials sourcing and construction it would be assumed that the Build/Project Manager will also be ready to adopt a **Life Cycle Analysis** approach to the acquisition of materials and build techniques. Life Cycle Analysis is a tool created to evaluate the sustainability of buildings and the materials contained in their construction at all the stages involved by minimising;

- Reliance on primary sourced raw materials,
- Energy and pollutants required to processing or manufacture and package products
- Energy required for and impacts of storage, transportation and retailing
- Energy required for and impacts of use and maintenance of materials and final build

Whilst maximising;

- The life span, durability and adaptability of the build
- The buildings performance efficiency
- Re-use and recycling
- The incorporation of sustainably sourced materials
- The sustainable management and mitigation of waste

Sustainable Construction can be improved through strict application of the following principles:

- Increase Thermal Mass by using materials with a high capacity to absorb heat energy within a building structure for later released as air temperature drops.
- Incorporate Earth Sheltering by covering surfaces except the south facing side, to provide additional insulation and/or to reduce visual impact and the area of exposed external wall.
- Improve sound insulation through thermal massing and/or earth sheltering this is particularly important in high density developments, such as terrace housing, flats and built up work environments.
- Ensure Ventilation is Natural by using natural cross air flows controlled and adjusted by building users. Install blinds to prevent build-up of heat from sunlight.
- Increase the longevity by incorporating durable materials and products
- Use design details to protect and prolong the life of the building for example;

- Incorporate features (such as deep roof overhangs) that protect the building from extreme weather
- Avoid vulnerable materials and details such as exposed roof parapets.

- Maximise the developments autonomy, or ability to supply its own energy, drainage and water needs.
- Incorporate thermal insulation to above current Building Regulation requirements. Ensure that windows and external doors are draught sealed. And incorporate air-lock or air lobbies to reduce heat loss. See also Energy Chapter.
- Improve thermal buffering by exploring the potential to link buildings or by attaching conservatories, garages and greenhouses to the outside of heated rooms.
- Improve solar gains through south facing windows with low emissivity double glazing to reduce heat loss etc and ensure window frame materials are thermally efficient timber frames have better thermal resistance than steel or aluminium. See also Energy Chapter
- Work with the natural environment;
  - Avoid herbicides and fertilisers that can damage soils and habitats.
  - plant on walls to help reduce heat loss, airborne dust, ground CO_2 and provide wildlife habitat
  - Plant trees shelter belt trees to reduce wind chill and provide summer shade whilst grounding CO_2 and providing wildlife habitat

Sustainable Acquisition of Materials can be improved through strict application of the following principles:

- Re-use materials from local sources wherever possible. Including reclaimed materials (e.g. second-hand timber) and recycled materials (such as glass / concrete or brick rubble for aggregates).
- Secure locally produced materials to minimise the impact of transportation and support the local economy. Specify that contractors do likewise and insist on examining their supply chain.
- Only buy reclaimed materials from reputable suppliers, to avoid supporting illegal markets of materials taken without consent or inappropriately from listed buildings and buildings of conservation importance, i.e. redundant buildings contributing to the environment of the area e.g. old farm, church and mine buildings which should not be 'robbed' of walling stone or slate.
- Only buy new materials from reputable suppliers, to avoid supporting illegal markets; i.e. specify that all timber hardwood and softwood is Forestry Stewardship Council accredited
- Assess when materials will be required and stagger delivery of materials to be 'Just-in-time'– causing lower likelihood of damage from handling and storage.
- Explore the local market in sustainable prefabricated elements, this has the following advantages;
  - Off-site manufacture is usually very well controlled and so it may produce less waste during construction to put together parts of the building off site.
  - External parts of the house will be erected quickly and internal fitting out may be done at the same time adding to efficiency in terms of reducing construction times. This could include foundations, using pre- cast ground beams on piled foundations for example, as well as the more obvious external and internal walls.
  - Specialist construction of some high rated sustainable elements off site may reduce some of the learning curves issues builders need to overcome to compete in a sustainable market place.

Sustainable Materials Choice can be improved through strict application of the following principles:

- Choose materials with a high-recycled content; recycled metals are often also more economically attractive, especially steel
- Ensure most materials that can be easily recycled when the life of the building comes to an end for example;
  - bricks, are easier to reclaim for reuse when lime mortar is used rather than Portland cement mortar.
  - Avoid composite materials that cannot easily be separated
- Favour materials from renewable resources over non-renewable sourced materials for example;
  - FSC certified timber rather than metal,
  - bio aggregates over primary sourced
  - linoleum made from natural oils and minerals rather than PVC
  - Specify FSC accredited high quality timber window frames and door jams rather than uPVC or aluminium.
  - Choose insulates based on such as sheep shoddy, recycled paper, straw, cork and hemp to create low impact, high thermal mass building and insulation materials
- Avoid materials such as plastic, steel and aluminium which require a high energy input in their manufacture and thus should be used sparingly.
- If stone is chosen for the benefits of being durable, easy to recycle, low maintenance and a high thermal capacity, it should be remembered that unless it is reclaimed these benefits are almost wholly offset by the need for transportation and the impacts of extraction.
- If brick is chosen for the benefits of being durable and re-usable, it should be remembered that unless it is reclaimed these benefits are almost wholly offset the high energy input into their production. This should be mitigated by specifying the sourcing of locally produced to reduce transport costs and the use of lime mortars in construction to facilitate recycling.
- If products such as cement and concrete blocks are chosen then lightweight versions using bio-mass such as hemp, waste or by-product materials should be specified.
- Specify the use of lime mortars in construction rather than Portland cements. Lime mortars not only to facilitate recycling but also significantly contribute to environmental health by absorbing nearly it's own weight of carbon dioxide from the atmosphere during the setting process.
- Choose timber for as many purposes as possible, for example structural timber, cladding, carcassing, window frames and door sets, internal joinery and panel products. Its growth locks up or grounds atmospheric carbon, its processing is relatively low energy and the thermally efficiency of the product is high. Take care however to ensure that it is sourced as locally as possible from well managed, independently FSC certified sources.
- Consider entering into the rapidly evolving use of Bio-Building Materials;
  - Packed Earth is highly sustainable requiring little energy in its manufacture and can be sourced as a by product of crop processing, i.e. beat cleansing for sugar production. It can provide high levels of insulation and in addition, earth sheltered buildings provide opportunities for habitat creation and landscape improvement.
  - Straw Bale is highly sustainable and can be sourced as a by product of cereal crop processing. It has incredible thermal mass and noise reduction properties.
  - Hemp is highly sustainable and can be sourced as a by product of oil crop processing. It also has incredible thermal mass and noise reduction properties.
  - Turf and sedum roofing which reduces rainfall run-off, improve insulation and provide habitat for birds and animals.
- Always use materials that do not produce toxic emissions within the building or whose production and end of life disposal leads to toxic waste;

- Choose natural water based paints or at least those low in Volatile Organic Compounds (VOCs).
- Many traditional wood preservatives used in timber treatment are toxic – attacking the nervous system and liver and increasing susceptibility to cancers. It is better to use hardwood, to avoid getting timber wet and to inspect and maintain the wood regularly. Ensure where timber elements are preserved it is with easily biodegraded low toxicity preservatives; Borates for example.
- Ensure paint strippers don't contain solvents such as dichloromethane, a known and highly toxic carcinogen that can be hazardous to health. In favour of those supplied by Environmental Buildings and décor suppliers based on water safe biodegradable alternatives and containing little or no solvents.
- Specify formaldehyde-free MDF
- Rule out PVCs in Window frames, doors and floor and surface coverings
- Rule out substances containing CFCs (chlorofluorocarbons) and HCFCs (hydrofluorocarbons); ensure CFC's aren't used as refrigerants in air conditioning for example
- Ensure insulants do not contain, or require during manufacture, ozone-depleting substances
- Ensure that fire suppression systems do not contain halons or penta/octa/deca-BDE (bromodiphenyl ether) flame-retardants

There is a growing body of research on the effects of long-term exposure to potentially hazardous materials such as adhesives, mastics, fungicides and other products containing solvents and other volatile organic compounds (VOCs). However, where there is little research available on the effects but a material may present a potential risk its use should still be avoided.

Maintenance

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter'

The ongoing maintenance, repair and refurbishment of buildings can have a greater environmental impact over their lifespan than their original construction. (Rethinking Construction 2003)

Strictly maintenance and management objectives should be considered at the outset or design stage of projects, as the choice of materials and complexity of its services and monitoring systems (especially for water and energy), will be crucial in determining how efficiency of its operation.

Maintenance responsibilities should be clearly defined, between occupants, utility companies, local authorities and specialist contractors. Owners and occupiers need to be provided with high quality guidance about using a new or refurbished building, improving their capacity and inspiration to optimise its 'green' potential. The onus should be on routine repair rather than replacement or structural change this is important as;

- In some older buildings some types of modernisation may trigger a decline that could threaten their survival.
- In some New Eco-builds some types of modernisation may affect overall performance of heating, ventilation and insulation.

On completion, buildings should be subject to Pre Occupancy Evaluation (POE) to ensure agreed standards have been met and to finalise the scope of maintenance contracts and guidance.

To Ensure Sustainable approaches extend through maintenance;

- Check the quality of the managing companies and/or maintenance contractors previous work and whether ISO-14001 certification has been gained. Take steps before entering into contracts to test their understanding of, and commitment to, sustainable projects, find out if they have been demonstrably successful in previous sustainable projects.
- Assess the future maintenance needs and regime at the design point to;
  - Devise a thorough, and realistic maintenance and assessment programme
  - Ensure that materials, labour and skills can be locally sourced
- Ensure contracts include measures to monitor environmental performance and enforce agreed penalties if targets are not met.
- Whilst choosing longer lasting materials and appliances that can save on operational and repair costs over time, avoid "maintenance-free" products if they involve the replacement of whole components rather than partial repair. Keep and check all manufacturers' servicing schedules.
- Ensure utilities controls are easily comprehensible and install accessible metering even if this is not required as it will provide an early warning system for problems.
- Ensure that funds and maintenance plans are available for routine, medium and long term management of habitats created or surrounding development schemes. Adjust seasonal maintenance regimes for soft landscaping to encourage wildlife and plant diversity, avoid herbicides and fertilisers that can damage soils and habitats.
- For larger schemes, consider training sessions or courses where key occupiers or managers can be 'targeted'.
- Provide a handover manual/occupiers pack with the option of a demonstration at handover; emphasising sustainable practices, clarifying maintenance responsibilities, explaining operating instructions for systems.
- Encourage occupier involvement in the management and monitoring of the developments environmental performance against targets for example;
  - In the analysis of energy and water meter readings.
  - In recycling waste.
  - In the upkeep of grounds / gardens.
  - By encouraging evaluation and feedback about living and working conditions.
  - By encouraging zero-tolerance for non-sustainable neighbourly conduct.

Standards, Policy and Legislation

Subsection of the 'Buildings – Adaptability, Durability and Materials Chapter' introducing policy framework containing the following information;

Local Context

Questions: Does the Authorities Local Plan include a policy relating to substitute materials? Does this policy enshrine the re-use of building materials from other developments where this is technically and economically feasible as a top level priority?
Has the Local Authority considered facilities for or entertained favourable agreements with suppliers regarding recycled materials storage and distribution?
Does the local authority have a related policy requiring new buildings to be designed for flexibility with the future in mind including creating opportunities to adapt to the changing needs of occupants and the creation of flexible interior layouts?
National policy urges increased use of secondary or recycled aggregates, how do the regional and local planning policies reflect this?
Does the Local Authority have qualified BREEAM Assessors amongst its personnel in readiness for the adoption of the code on Sustainable Building?
Has the Local Authority developed a voluntary 'considerate and sustainable constructor's charter'?

To create a high standards framework to achieve genuinely sustainable objectives Members could adopt the step programme of inquiries and actions detailed at this point in the Energy Chapter

Regional context

Questions: How does the Local Authority know and evidence that at the regional level:

- Is sustainable construction is a key area of action for the Regional Assembly's do they have a Promoting Sustainable Development Group or equivalent?'
- Are there key objectives in the Integrated Regional Strategy to manage the natural resources of the region sensibly, minimise waste, and to encourage re-use and recycling of waste materials.
- What policies (list i.e. Policy 31,32) of the Regional Planning Guidance for promote the use of local building materials etc.
- Could the region facilitate – reducing costs to each Local Authority overall - the qualification of BREEAM Assessors in readiness for the adoption of the code on Sustainable Building

National Context

The Government has expressed its commitment to achieving more sustainable developments at the Better Buildings Summit in October 2004 which led to the establishment of the Sustainable Buildings Task Group (SBTG) chaired by Sir John Harman. The task group have now published two reports regarding the reduction of the environmental footprint of buildings including the contribution of building materials. The group have made further recommendations regarding the quality and sustainability of new and refurbished buildings.

The Government is committed to a new Code for Sustainable Building by April 2006 and has been recommended by the SBTG to;

- *Impose a condition on the contract sale of land bought from the public sector so that new housing must apply the code*
- *Adopt a standard of the Code comparable to the EcoHomes 'very good' …encouraging Regional and Spatial Strategies to do the same.*
- *Create a programme of action for.. Local Authorities to adopt the Code for Sustainable Building by April 2006*
- *Develop the Code to apply to existing housing stock*
- *Adopt Assessment arrangements based on BREEAM*
- *Ensure Part L of the Buildings regulations (on energy efficiency) achieve a 25% level of improvement. And adopt a robust post build checking regime through the buildings regulations to ensure a high level of compliance and enforcement.*
- *Deliver on its target 25% improvement in water efficiency in New Build through regulation*
- *Through the Buildings Regulations require industry to use minimum 10% recycled, reused or reclaimed materials in construction work.*
- *Bring in measures requiring new multi-occupancy build to provide space for the separate collection of recyclable materials*
- *Provide new policy and best practice guidance on Sustainable Building to accompany PPS1 incorporating the Code for Sustainable Building.*
- *Introduce fiscal measures rewarding building quality and environmental performance*

- *Use the compulsory introduction of the Home Information Pack to improve environmental performance of existing housing stock including water efficiency and eco-labelling.*

Source Sustainable Buildings Task Group report: one year on Progress 17th May2004 –17th May 2005

Such standards as adopted must be quickly incorporated into local authority policies, planning guidance and post completion checking regimes.

- **Building Regulations** require minimum standards for heat loss through the fabric of the building, heating, hot-water systems, the insulation of pipes and ducts and space-heating controls. April 2002 Revisions increased standards for the insulation of the building fabric and introduced extra standards for reducing cold-bridging at junctions between walls, roofs, floors and windows and reducing air leakage for all buildings. The performance of replacement windows and improvements to insulation if existing buildings are being altered materially. And proposed 2006 revisions on the conservation of fuel and power covering both dwellings and buildings that are not dwellings and targeting improved standards for the insulation of pipes and water storage, and minimum energy performance requirements for new buildings in the form of target CO_2 emission rates.

- **Revisions to the Planning Policy Statement 22 on Renewable Energy** now make clear that the wider benefits of renewable energy developments are material considerations in planning decisions.

- **Aggregates Levy**
  The aggregates levy, is applicable to any sand, gravel or crushed stone extracted in or imported into the UK. The levy makes the price of aggregates reflect environmental costs by increasing the cost primary sourced aggregates (in line with the 'polluter pays principle') and making the use of recycled and secondary materials more viable. Revenues raised are marked for the delivery of local environmental improvements aimed at delivering local environmental benefits to areas subject to the environmental costs of quarrying. The Aggregates Levy Sustainability Fund uses revenue from the Aggregates Levy to reduce the environmental impacts per tonne of aggregates extraction and helps to stimulate the market for recycled and secondary materials

- **Land remediation relief:** Businesses may claim relief from corporation tax if they clean up contaminated land, in the UK acquired by the company to carry out its trade and contaminated at the time it was acquired either wholly or in part. The relief can total upto of 150 per cent of the clean-up cost. Land remediation tax relief should be claimed for in **tax returns** and companies making a loss because of spending money on cleaning up land may apply for a tax credit of 16 per cent. The relief is only available to companies, not to individuals or partnerships.

European Context
Need more checking at this point as there have been a number of recent changes which need addressing.

International Context
By becoming a signatory nation of the 1997 Kyoto Protocol the UK has signed up to a legally binding target of reducing greenhouse gases as a whole by 12.5% by 2008-12. In line with the advice of the Intergovernmental Panel on Climate Change (IPCC) the UK must aim for a reduction of 60% in CO_2 emissions by 2050.

It will be impossible to achieve such targets without developer maximising the integration of energy from local renewable sources where ever possible**.** This might include solar space and water heating, solar electricity generation (photovoltaics), wind power, biomass fuel and other sources of energy.

Voluntary Standards
In addition to all the legislative standards there are also some voluntary standards which developers are increasingly choosing to meet, and which the Sustainable Buildings Task Group have used as indicative of the scope of the developing National code, these include;

Environmental Standard Award
The Environmental Standard Award is administered by the Building Research Establishment (BRE) and is intended to provide an indication that a development has reduced its impact on the environment. New homes are assessed under a range of criteria including emissions of greenhouse gases and CFC's, use of materials, site ecology, water use and levels of comfort.

BREEAM

For non-residential development assessment methods such as the BREEAM rating can be applied. Using BREEAM, buildings are given a score which provides an indication of their environmental impact. Issues considered include CO_2 emissions, healthy building features, air quality and ventilation, minimising ozone depletion and acid rain, recycling and re-use of materials, ecology of the site, water conservation, noise and lighting. Major building elements (i.e. upper floor slab, external walls, roof and windows) should achieve an overall 'A' rating as detailed in the Green Guide to Specification 'A' (BRE 1998).

ANNEX A

Renewable Energy

Renewable Energy, electricity and/or heat, is sourced from fuels;

- Which always replenish themselves, - such as the heat of the sun, wind and water movement
- Or with a little management can be continuously restored – such as wood, reeds, straw
- Or occur as the captured bi-product of other natural cyclic processes – such as the gasses produced from the anaerobic (airless decomposition by bacteria) of sewage or the decay of organic (primarily soft green) waste.

The following parts of the Chapter present a guide to;

- The different sources of renewable energy,
- Their associated technologies
- And practical considerations in respect of the applicability or ease of using a particular source in a given environment.

Biomass

Biomass: is the shared description for the controlled release and use of the energy potential locked up in **trees and plants** – straw, reeds or willow - or created as a part of regularly recurring natural processes – the bi-products of the process of decomposition or the bacterial **digestion** of natural things i.e. sewerage, various farm wastes or decaying material such as garden clippings and/or other largely natural materials such as paper.

Dry Bulk Green Biomass: releases the locked up energy through burning the primary fuel source - wood, straw, poultry litter (mix of straw and droppings) or crops purposely grown for energy such as miscanthus a perennial reed, rush or wet land grass. Energy produced from green biomass can be as adaptable as that from coal burning - i.e. everything from the heating of a domestic property to the fuelling of a national grid connected power plant. Like Coal burning green biomass produces Carbon Dioxide (CO_2), it fundamentally differs from the burning of gas, oil or coal however in the following respect plant life needs CO_2 which they take from the air or atmosphere to grow. As they do so they 'ground', or lock up the form of carbon that would otherwise contribute to global warming and release life giving oxygen to the animal kingdom. Green biomass fuel sources can therefore be described as 'Carbon Neutral' in that the carbon they produce as CO_2 on burning is generally less than or equal to the carbon they use and render safe whilst growing.

Green Biomass Primary Sources

- **Straw** is a natural bi-product of cereal or seed-oil crop production in the UK and can either be used straight after the harvest of grain, or burnt

after it has been used as bedding for livestock; extending the marketable value of the product for our agricultural industry.

- **Wood** or more accurately trees, particularly those species that can be grown on short rotation coppice or pollard[1] like Willow, Plane and Poplar have a variety of additional benefits depending on the location of source. Willow has been used for many hundreds of years for the ability of its roots to stabilise and add structure to fragile river banks that would otherwise be more likely to silt up rivers and contribute to overspill and flooding; CO_2 related global warming has increased the likelihood of flood incident in the UK. Poplar and Sycamore are highly resistant to pollutants and can be planted in close proximity to city environments cleansing air and making city living healthier where other species would die. Vigorous young Poplars[2] are relatively resistant to pollutants, have a rapid growth cycle and add value as graceful compact shelter belt forms.

  Other sustainable sources of wood include forest management bi-products left over from timber processing, grounds maintenance/tree surgery waste and reclaimed demolition timber etc. Whilst non coppiced or pollarded wood is also a potentially valuable source of biomass it must come from FSC certified sustainable sources, where trees felled for fuel, are replaced by an equal or greater planting of new trees of the same kind.
- The growth of **Miscanthus** is best suited to water meadow (places that get wet or flooded in winter but drain naturally in summer; may sometimes be described as flood plain habitat. Historically these environments have been under threat due to forced drainage to create further space for economically viable agricultural land.
- **Oil seed crops** such as Rape, Hemp and Maize (Sweet Corn) are already being processed to produce alternative sources of transport fuels to petrol or conventional diesel such as ethanol (a form of alcohol) and **biodiesel**.

  In addition to the production of seed for oil, **Hemp** stem fibre can be used in the production of fine grade natural fibres equivalent to cottons, thermal mass insulation or as a fuel in the same way as straw. Unlike Cotton agricultural Hemp will grow in UK climatic conditions – cutting out or largely reducing the transportation impacts - and needs little or no pesticide or supplementary fertiliser minimising other environmental pollutants.

  The stem fibres and husk of other oil seed crops whilst not as adaptable as Hemp may be used in digested to burn or burnt.
- Non-hazardous organic industrial, construction or municipal bio-wastes (such as arboricultural thinnings) may also be applicable. Additional care must be taken with such sources to guarantee that emissions and residues from such waste to fuel sources don't cause environmental problems.

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[1] coppice or pollard: the controlled cutting of a tree to promote rapid shoot growth which is harvestable on a recurrent basis usually 3-4 years,

[2] Poplars due to their tall tongue shaped growth (which catches the full brunt of prevailing winds) and susceptibility to concealed heart wood rotting should, on a relatively short aging cycle, be renewal felled and replaced in the interests of public safety.

Anaerobic Digestion captures and diverts for fuel the methane produced by the rotting of **wet wastes** (such as soft green materials including municipal bio-wastes or slurry) in temperature-controlled containers through a process known as anaerobic digestion. This can then be used to fuel gas engines producing electricity and heat.
Examples of chicken litter combustion, animal slurry digestion and straw combined heat and power projects are already powering well in this country. Adoption of digestion systems may offer local authorities an opportunity to manage compostable green wastes more effectively.

Biomass to Power
At domestic to medium scale (municipal or office build) wood may be used as wood chip, wood pellets or logs, in wood/pellet burning stoves or wood chip/pellet boilers for space and water heating. For single room heaters or stoves with automated wood pellet feed used for heating a single rooms and hot water or a whole house.

For commercial or larger scale community electricity production wood and other biomass materials can be used in a variety of ways generally assessed on the scale of production desired;

- In electricity producing combustion plants the material is burned to effect steam generation.
- Gasification plants heat the material with air steam or oxygen in such a way that gases are given off for burning in boilers, chambers or turbines.
- Or through Pyrolysis processing plants where the green material is heated in the absence of oxygen producing;
    - Combustible gases of an energy value generally ½ that of natural gas,
    - Low energy charcoal which can be upgraded if required
    - and a bio-oil liquid effluent (which must be treated to prevent water pollution.

Most medium to large scale biomass generation lends itself to co-generation or the production of combined-cycle or combined heat and power (**CHP** see below) production improving the total energy output of the operating system. Depending on the primary fuel source and generating system deployed the ashes formed may be applicable for use as;

- Soil improvers/fertiliser for agricultural purposes
- Road clinker
- Or must be considered and assessed for safety as landfill

Large scale Biomass also presents established grid connected opportunities to explore **Co-firing Potential,** where a proportion of the energy produced from fossil fuel combustion is supplemented.

Critical Factors in Assessing the applicability of Biomass:-

Availability of primary fuel source: -

- Land use in the Yorkshire and Humber Region is chiefly agricultural, rural areas covering around 80% of the region; accounting for about $^{1}/_{5}$ of the population. Cereal, seed oil and hemp crop production are pre-established in the York area. In addition to which there may be sufficient animal husbandry – assessments regarding the relationship to pig, cattle and poultry - to support litter based and/or slurry digestion biomass systems. These possibilities could possibly create secondary income streams for the farming community, and additionally CHP nets for 'off-gas' communities which are generally rural thus creating a valuable sustainable cycle.
- Large tracts of the N.York Moors are given over to managed forestry, however, the home demand for the supply of good grade sustainably sourced building timber should take precedence over fuel supply, reducing likely overall volumes for biomass to sawmill processing waste.
- The Vale of York has some tracts of degraded or species poor flood meadow (which would need careful differentiation from species rich acreage) and river margin which might be considered for environmentally aware miscanthus production and/or willow coppice.

Security and Costs of Supply: -

- Transportation costs and associated emissions are a significant factor in determining the economic and sustainable viability of Biomass. Depending on the energy value of the primary fuel type, experts suggest that ideally the harvest or collection site should be between 10-25 miles from the energy conversion site.
- Secure primary biomass sources are well evaluated on their understanding of timed cycles of source renewal, demand, storage and handling required. Or the ability to predict the local capacity to produce the required volumes of the chosen fuel material to maintain constant and efficient operation of the system over a period ensuring systems life profitability once processing, generation, staffing, transportation, waste management and other associated costs have been deducted.

Design and Permissions: -

- Generally a high level chimney or twin walled stainless steel pipe flue are required to vent gasses released on combustion away from the building, for safe atmospheric dispersal; such flue systems may be fan assisted to improve performance.
- For medium to large scale combustion systems wall mounted air-grill ventilation is required to provide adequate combustion flow, domestic burners and stoves draw from room which will need adequate through flow from air-bricks or similar. Flow does cause some heat loss which can be compensated for by fitting positive pressure ventilation in the roof space and heat recovery systems.
- The Local Authority Planning Department should be contacted prior to flue fitment especially where proposed flue heights exceed the roof-line

as planning consent is likely to be required. The Planning Department will also wish to consider proposals in respect of their relationship to conservation areas and areas of outstanding natural beauty.

- Under the clean air act wood must only be burned on exempt appliances in smokeless zones.
- Installation must comply with safety and buildings regulations.
- Local Planning Authorities handling applications for anaerobic digestion, must carefully consider the potential impacts of odour and proposals put forward for its control. Where odour would have an impact, plants should not be located in close proximity to existing residential areas. (Planning Policy Statement 22: Renewable Energy)
- Whilst the need to transport fuel to Biomass plant may lead to increases in traffic in determining planning applications, and should ensure this is minimized by citing plants as close as possible to proposed fuel sources, the authority should recognise that the primacy of other considerations (i.e connections to the Grid and the potential for CHP). (Planning Policy Statement 22: Renewable Energy)

Biomass Exemplars
The UK has some of the largest examples of the use of Biomass to generate electricity in Europe.

Large Scale
At 38MW Ely Power Station generates over 270GWh each year and is possibly the largest straw burning power station in the world. Planning permissions have allowed Ely to successfully incorporate oil seed rape and miscanthus fuel sourcing in addition to cereal straw. The plant requires 200,000 tonnes of fuel each year; supplied by Ely's sister company Anglian Straw. The power output from the plant is sold under an NFFO contract that terminates in 2013.

At 38.5MW generation, Thetford chicken litter fuelled plant Norfolk consumes 420,000 tonnes of litter each year and is possibly the largest biomass plant in Europe. The plant located at the heart of poultry production in England uses litter sourcing managed by a dedicated team. The plant has successfully trailed the burning of feathers and other agricultural residues. EPR operates and maintains the energy plant and as a bi-product quality fertilizer is marketed through a group owned subsidiary. Power output from the plant is sold under an NFFO contract that expires in 2013.

Small-Medium Scale
In Feb 2004 RSPB Wetland Centre Old Moor South York's entered into contract with a local sawmill for delivery of 1 ton of sawmill off cut material – delivered bi-weekly (summer) and twice weekly winter - to power a 100KW boiler.

For more Information:-

British Biogen - The Industry Trade Association; for more information about every aspect of biomass in this area www.britishbiogen.co.uk

DEFRA, English Rural Development Programme; for advice about support schemes for growing energy crops and establishing producer groups. www.defra.gov.uk/erdp/shemes/energy/default.htm

The National Non-Food Crops Centre, York; for advice about systems, crops and industry contacts www.nnfcc.co.uk

Clear skies for; individual and community grant support for automated pellet feed room heaters and stoves. www.clear-skies.org

Heat Pumps

Heat Pumps rely on the absorption of the heat produced by the sun being drawn into a compression unit with an evaporator coil heat exchanger which works like a fridge in reverse; making it possible to produce heat from external air temperatures of as little as –15^{o} C, or constant UK ground (12ºC), or water temperatures.

All heat pumps require an **operating power supply**; preferably solar photovoltaic panels or a wind turbine if the system is to be considered truly renewable. For each unit of energy the pumps use they will generate 3-4 units of power so other sources of operating supply would still deliver 60-75% renewable heating. Users could also consider subscribing to a green tariff scheme, promoting the use of renewables by generation companies.

With Air Source;

- The Heat pump **compressor** which takes the air delivered and upgrades it using the latent heat of a refrigerant to up to 75^{o}C.
- The heat gained is transferred to a space heating distribution system such as conventional radiators.

Critical Factors in Assessing the Applicability of Air Source Heating

- Systems are low noise, robust and reliable requiring little maintenance and offering a typical 20 year life expectancy.
- The units are small (roughly the size of a large suitcase) and wall mounted
- Safety characteristics rank high as there is no reliance on combustion
- Systems are most effective for smaller scale units with fairly high constant level heating demands i.e. domestic or office space etc
- Systems are simpler to install than ground source

With Ground Source

- A **closed underground, piping circuit** which has water pumped through it as the conducting medium transferring the underground energy. There are two principal types;
    - **Vertical heat exchangers**; which run deep into a narrow shaft fairly close to the building

  - Or Horizontal or **Slinky Exchangers** where the pipes coil in long narrow trenches away from the building
- The Heat pump **compressor** which takes the water delivered at about 11°C and upgrades it using the latent heat of a refrigerant to between 40-50°C.
- The heat gained is transferred to a space heating distribution system i.e.
  - Under floor heating (which is the most efficient)
  - Low surface temperature radiators
  - Or low temperature air distribution

Critical Factors in Assessing the Applicability of Ground Source Heating

- Systems are low noise, robust and reliable requiring little maintenance and offering a typical 20-25 year life expectancy.
- Safety characteristics rank high as there is no reliance on combustion
- Reversible ground heat systems can also be used to remove heat from a building and deposit it back into the ground to cool the building during hot weather
- Supplementary systems are required if the system is used for hot water provision as ground source alone will not heat to required levels for pasteurisation; this could be solar.
- Systems are most effective for units with fairly high constant level heating demands i.e. schools, residential care homes etc
- Systems will actually work more efficiently in the presence of a high water table

Water Source; works roughly equivalent to ground source only the piping circuit is laid in flat loops at the bottom of a pond or lake.

Design and Permissions: -

The permissions pointers for the operating power supply will need to be considered i.e. if solar see relevant permissions summary.

There should not be need to obtain Planning Consents for the ground source system itself as it hidden within the building or ground.

There should not be need to obtain Planning Consents for the air source system in anything other than protected builds or conservation areas.

Heat Pump Exemplars: -

For more Information:-

Heat King manufactured in Brighouse for information about local supply www.heatking.co.uk

The European Heat Pump Website; www.fiz-karlsruhe.de/hpn/hpn.html

The UK Heat Pump Network for; finding out more about the developing market and environmental and economic best practice www.heatpumpnet.org.uk

The website of the Ground Source Heat Pump Club: www.gshp.org.uk

Clear skies for; general information about Ground Source Heat systems, and, individual and community grant support for installation www.clear-skies.org

The Geothermal Heat Pump Consortium for; a range of residential and commercial sector case studies as well as technological information www.geoexchange.org

The IEA Heat pump programme for; information serving the Industry needs on policy, development and distribution www.heatpumpcentre.org

Hydropower

For centuries we have used water wheels to drive mills and machinery, Hydropower could indeed be described as the catalyst of the industrial revolution in this country. In 2004 modern Hydropower accounted for the largest share of renewable sourcing, some 4% of all electricity produced in the UK. Most generation still comes from large dam projects installed many years ago but small scale hydro is increasing, and it is suggested that the York's and Humber region has potential to create at least 9.5MW of capacity from smaller scale generation.

All hydropower technologies turn the potential or kinetic energy of water into electrical generation by means of a hydro turbine.

Small Scale Hydro Turbines comprise of;

- Water power "dropped" from behind a dam or storage reservoir or from a flow head within the river such as water intake above a weir or behind a dam. It is now possible to produce a few tens of kilowatts of electricity from low water "heads" of 2 - 3 metres.
- After adequate volumetric flow and/or water pressure - which will determine the amount of power attainable - have been established most hydro systems require a water transport system and flow control system channelling the water to the turbine.
- Water passing through the turbine generates energy in the same manner as the blades of a wind system, the turbine is connected to an electrical generator converting the kinetic energy into electricity.
- The electricity generated in small systems may be direct current (DC) which can be stored in batteries but needs to be run through an invertor or DC/AC converter producing Alternating Current for domestic circuit use. Electricity may also be diverted to the grid.
- The water passed through the turbine then directed back to the water course through an outflow.

Critical Factors in Assessing the Applicability of Hydro Power: -

- As a general rule of thumb, capital costs rise as available head decreases. Sufficient head to give an output over the systems life ensuring payback of the installation investment capital should be established.
- A degree of existing infrastructure, i.e. a disused mill/weir etc are likely to improve project profitability.
- Costs vary immensely depending on the type of hydro resource available and the system installed.
- A system producing less than 10kW may not worth grid connecting, unless grid connection infrastructure is already present. 10kW size systems are better suited to battery charging or secondary backup for a critical load, such as old generators.

Design and Permissions: -

A licence needs to be obtained for a hydro project from the Environment agency.

Planning permission may also be required from the local authority.

Hydro Exemplars: -

For more Information:-

For more information about hydropower and list of suppliers, please visit the British Hydropower Association's website at www.british-hydro.org

For information on grants, please visit the Clear-Skies website at www.clear-skies.org

Solar Energy

Sunlight is a free, constantly renewed source of light and heat, and its benefits are increasing being built-in to new developments or added into refurbishment or re-use projects. There are three primary approaches used to harness solar power in the UK today;

- **Passive-solar gains**,
- **Photovoltaic** cells that generate electricity,
- and **Solar-thermal** panels that heat water.

Passive-Solar Gains: rely on design specifications and material elements aimed at maximising the conversion of sunlight into heat and significantly reducing the amount of heating required to achieve and maintain thermal comfort. To build in solar gains and maximise the absorption of radiant energy into the buildings fabric buildings should be;

- Orientated with the main elevation or glazed face of the building to within 30 degrees of due South
- Spaced to ensure buildings structures, shelter break planting and high walls don't overshadow. Note, however, that the planting of native deciduous trees to reduce overheating in summer whilst minimising shadowing in winter should be considered.
- Incorporating a greater proportion of glazed areas on the southern elevations to increase passive solar gain and natural day lighting.
- Using roof lights and atriums to bring light and solar heat into the centre of buildings.
- Using advanced solar and double glazing systems for windows and doors; preferably framed with sustainably sourced wood.

Whilst full application of passive-solar gains techniques may not be practical in all locations due to prior spatial positioning, as many of the techniques as possible should be incorporated into re-use, refurbishment or new build projects to reduce the reliance on supplementary energy sourcing.

Photovoltaics:

'Photovoltaic' is a word conflation of the Greek *photo* meaning light and *voltaic* associated with energy production.

Photovoltaic (PV) systems or PV cells are constructed using thin layers of semi-conducting material, most commonly silicon, which on exposure to light, generate electrical charges. The charges are conducted away by metal contacts as direct current (DC) to an invertor or DC/AC Converter providing Alternating Current for domestic circuit use. Alternatively DC can be used of a specific DC lighting circuit, but this technique is primarrly used in properties that are not grid connected.

To give the desired electrical output multiple cells must be connected together , as single cell output is small, the cells are encapsulated (typically in glass) to form a **module** or 'panel'. Electricity produced can either be used immediately or stored for later.

Photovoltaics lend themselves to a variety of familiar applications and operation scales. Simple cell systems are commonplace in calculators and watches, mini panels in some battery collector systems for domestic burglar alarms, garden lighting or fountains, and increasingly larger systems for parking meters and street lights.

The adaptability of PV lends itself to larger scale output where multiple PV modules or panels are connected together to form an **array**. When production exceeds demand arrays can be grid connected to the electricity network selling power back to an electricity supply company. Grid connection acts as an energy storage system, eliminating the need to include battery storage into the PV system.

Critical Factors in Assessing the applicability of Photovoltaics:-

PV technology offers enough scope to potentially generate pollution and noise-free electricity in any environment without necessarily using extra situational space.

- PV modules or arrays generate more energy when they are positioned in fixed units facing near south (south-east, south-west) away from any shadows from trees, surrounding buildings or chimneys at a tilt angle of 30-60 degrees or mounted on solar tracking systems.
- They can be incorporated into the buildings façade in a number of ways, sloping rooftops using frame mounts being ideal, where the frame provides an underflow air path to avoid excess heat build up under the panel.
- Photovoltaic systems can also be incorporated into the actual building fabric for example;
- Monochrystalline glass encapsulated cell systems – life expectancy 25-30 years - can be incorporated into the glazing of conservatories or sunroofs where the building provides airflow.
- Polychrystalline cell systems – life expectancy 20-25 years – have an iridescent blue black mirror glass finish which can be usefully incorporated to stunning aesthetic effect in wrapped roof arrays on modern builds.
- Amorphous systems have a matt colourised finish that may be more architecturally discrete for some locations. PV roof tiles are also now available and can be fitted as would standard tiles making them a good choice if re-roofing is required. This rapidly growing market in PV innovation, is being mainstreamed by the UK Major Photovoltaic Demonstration Programme who may provide project funding; see www.solargrants.org.uk.
- Photovoltaic systems can be the most cost effective power source where grid power supplies are unavailable or difficult to connect to. PV adapts well to combined sourcing for community generation networks where biomass, wind or other renewables generation, forms part of a hybrid power supply system.
- Consideration should always be given to the desired systems output or electricity needed which should be a determining factor in the type of system chosen.
- To directly generate hot water – solar-thermal not PV technology is required.

Solar-thermal

Solar Panels, also known as solar-thermal "collectors", use the sun's heat to warm water, or another liquid, as it is passed through the panel. The warmed fluid then progresses to a heat store (at the simplest level a hot water tank) supporting the provision of hot water or space heating via a central heating system. Solar thermal collectors will work throughout daylight hours, even if the sky is overcast and there is no direct sunshine.

Critical Factors in assessing the applicability of solar-thermal: -

Solar thermal technology comes in two varieties - flat plate and evacuated tubes - and will potentially generate around 50-60% of a buildings hot water requirements pollution and noise-free over the year; in summer months the output will be greater with either system. The Department of Trade and Industry estimate that half the existing UK housing stock could easily be fitted with solar hot water panels.

Flat plate collectors are the simplest form and generally have a lower efficiency than evacuated tube systems that may require location over a larger surface area to meet demand. They are constructed from sheet metal painted black (encouraging absorption of the suns energy) and housing coiled piping attached to the sheet panel that picks up the heat from the metal. The unit is set in an insulation box covered with glass or clear plastic at the front reducing heat loss and exposure, the pipes are generally copper improving conduction and in the UK climate pipe work contains non-toxic anti-freeze (glycol). The hot liquid passes through transfer piping which passes through the water storage system loosing its heat load before returning to the collector.

Evacuated Tube collectors: are more efficient systems, which rely on the grouping of highly insulated vacuum tubes, reducing heat loss from the absorption surface.

- Optimum systems size should be calculated using software to simulate system performance throughout the year. Typical UK domestic installation uses a flat plate panel of 3 to 4m^2 or evacuated tube system 2m^2 connected to a storage tank of 150- 200L, at the other end of the scale solar-collectors are being used for large scale water heating in swimming pools and leisure centres. Over-sizing of domestic systems is unlikely to justify the greater investment in additional energy savings.
- During the summer months modern systems can be so efficient that the hot water may run too hot, creating a risk of scalding. To protect the young and old who are most vulnerable and reduce this risk the installation of thermostatic mixing valves as part of the system approach should be considered.
- The system will usually require the installation of a new large hot water cylinder. Vented cylinder systems work with a cold pressure cistern systems housed in the loft. Mains pressure (un-vented) cylinders and thermal store cylinders ensure hot water is maintained at the same pressure as the mains supply allowing, for example, the running of power showers without additional pumping.
- Costs for professional installation vary significantly and independent advice should be sought to ensure the best system for the situation and value for money. Collectors should have been independently tested for thermal performance (to BS EN 12975 or BS EN 12976 standards) and suppliers should provide this information. The Clear Skies website (www.clear-skies.org) or scheme help-line on 08702 430 930 is a good first point of reference.

Design and Permissions

- The Local Authority Planning Department should be contacted prior to the installation of collectors or PV if there are proposals to install in conservation areas.
- Installation must comply with safety and buildings regulations.

Solar Exemplars
The Region already has some of excellent examples of the use Solar PV and Solar thermal

Large Scale
Primrose Hill Solar Regeneration Initiative, Newsome, Huddersfield
PV and solar thermal installation on 121 new and existing houses commenced in March 2005 on existing properties and new build in late 2005. On completion this will be one of the largest comprehensive solar installations in the country delivered as part of an overall regeneration plan for the Primrose Hill area. Combined capacity will deliver 76,706 kW/yr PV
108,990 kW/yr Solar Thermal creating annual savings of 33 tonnes of CO2 and £4,985.90 PV (@6.5p/kWh) from avoided electricity import.

Medium Scale
Titanic Mill CO_2 neutral development, Linthwaite, Kirklees
Mill conversion to luxury apartments project incorporating a roof mounted 50kWp solar PV system generating 38,115 kW/yr, saving annually 16 tonnes of CO_2 and £2,401 (@6.3p/kWh) in avoided electricity import. It is also proposed that the Mill uses hybrid sourcing through biomass, to make the development carbon neutral once completed.

Fieldside Place, York?

Small Scale

For more Information:-

Solar Trade Association's website at www.solartradeassociation.org.uk

PV-UK The Photovoltaics Industry Trade association www.pv-uk.org.uk

For UK PV grants; www.solarpvgrats.co.uk

Clear skies for; general information about Solar Collectors and PV systems, and, individual and community grant support for installing Solar Collectors and PV systems www.clear-skies.org

Wind

People have wind energy as basic mechanical power for grain milling and water pumping for centuries. Wind **turbine** technology harnesses the energy of the wind more fully to generate electricity for export to community networks, the grid or single applications.

Wind Energy is used across a broad spectrum of applications in the UK from the charging of small battery systems producing electricity remote from the distribution network, to large multi-turbined **wind farms** producing electricity on the scale of conventional power stations.

Wind turbine systems comprise of ;

- A set of blades - most commonly three - mounted on a horizontal axis with a rotation pivot which will move the blades to capture the most favourable directional force.
- The blades are connected by a rotor shaft, either directly to an electrical generator, or to a generator via a gearbox for larger turbines.
- The electricity generated in small systems tends to be direct current (DC) which can be stored in batteries but needs to be run through an inverter or DC/AC converter producing Alternating Current for domestic circuit use.

Critical Factors in Assessing the Applicability of Wind power: -

- Low cost electricity can be produced the windiest sites for as little as 2 pence per kWh, comparing more than favourably with increasingly costly electricity from conventional sources. Typical wind powered electricity costs between 2p/kWh and 10p/kWh dependant on scale and location.
- Wind power produces no pollutants or emissions during operation and modern designs are generally quiet. Energy used in the manufacture of the system is repaid within 3-9 months of operation.
- The near silent operation of modern designs is described as causing less noise than the wind in the leaves of a tree. Gearbox free turbines are always best for noise sensitive environments. Local Authorities are required to assess[3] aerodynamic noise from installations such as wind turbines and ensure that they are located and designed in such a way to minimize these. (Planning Policy Statement 22: Renewable Energy)
- Small wind turbines can be situated on the top of buildings or towers in the built environment to capture the increased wind speeds at higher levels; these must be very securely mounted however as strong gusts and turbulence will otherwise cause vibration of the turbine increasing wear. The advice of a structural engineer regarding mounting implications should be sought.
- Land used for situating turbines does not diminish in agricultural value and both short and long term job opportunities are created in the building and maintenance of turbines.
- Wind systems may be perceived as visually impacting upon the environment, whilst this is less likely to be a valid objection with small scale applications in built environments it is still the most contentious aspect in locating wind farms.

Design and Permissions: -

[3] The 1997 report by ETSU for the Department of Trade and Industry should be used to assess and rate noise from wind energy development this is available at http://www.dti.gov.uk/energy/renewables/publications/noiseassessment.shtml

The Local Authority Planning Department should be contacted prior to the installation of turbines as they will wish to consider proposals in respect of their relationship to conservation areas or areas of outstanding natural beauty.

Local Planning Authorities should not treat wind turbine proposals prohibitively, issues of impact on air-operations and separation distances from power-lines, roads, and railways should be addressed by the developer before submitting planning applications and not included in local authority policy. (Planning Policy Statement 22: Renewable Energy)

Installation must comply with safety and buildings regulations.

Wind Exemplars: -

For more Information:-

The British Wind Energy Association – the largest renewable energy trade association in the UK - for; more information about wind power and a list of suppliers, www.bwea.com

Clear skies for; general information about turbine systems, and, individual and community grant support for installation www.clear-skies.org

Other

Biodiesel is primarily applicable to transport at the present time. Most car manufacturers will support a blend of 5-10% Biodiesel and 95-90% fossil diesel and this is increasingly available in petrol stations, blends can match conventional fuel performance in most cars without engine adaptation and consequently the market place availability of these new fuels is expanding.

With minimal cost engine modifications, filtered vegetable oils can also be used as effective fuel for diesel powered engines; modification kits are now readily available for DIY or garage adaptation and don't stop the engine running on fossil diesel if necessary. Biodiesel can also be prepared from used vegetable oils (from industrial food processing, restaurants etc.)

For more information: -

British Association for Bio Fuels and Oils (BABFO) – the trade body for producers: www.biodiesel.co.uk

Veg Oil Motoring: www.vegoilmotoring.com

For Biodiesel retailers: www.biodieselfillingstations.co.uk

For suppliers of Biodiesel: www.rixbiodiesel.co.uk
or www.broadlandfuels.co.uk

Or if your thinking of making your own: www.lowimpact.org

Geothermal energy takes the form of heat rapidly conducted from the earths molten core to reservoirs within 10K of the earths surface. This may naturally create, or be used to create, superheated steam powered generation and hot water and space heating for community networked industrial, agricultural and domestic application. Geothermal offers huge global energy supply potential and already powers plants in Italy, the USSR New Zealand and the US. Iceland's capital city Reykjavik sources 95% of its buildings heat requirements from geothermal springs supplying 86℃ heated water. Unlikely application to York's and the Humber.

Combined Heat and Power (CHP[4]) is not in and of itself a renewable energy source, CHP units were originally designed to maximise efficiency in fossil fuel firing, using natural gas, commercial grade oils and coal. Increasingly however CHP is used to maximise the energy potential of co-fired plants, waste to fuel systems and biomass combustion. The latter application being totally renewable, in this application CHP delivers the double bonus of creating significant reductions in greenhouse gas emissions additional to the carbon neutral primary sourcing.

The application of Combined Heat and Power improves the efficiency of traditional combustion power generation by reclaiming the heat produced as a by-product of electricity generation; as little as 35-50% of the energy value of fuels used in large power stations are converted to power. Diverting the reclaimed heat load through CHP systems for local space heating requirements raises the useable energy value of the primary fuel source by another 35-40%. CHP systems will also reduce the amount of primary fuel required for heating and electricity generation by around 35% and cuts in overall CO_2 emissions of 30% may also be expected.

The core components of a CHP system are;

- A fuel feed to a prime mover the combustion engine driving the generator and creating the heat source; in larger systems one or more prime movers usually driving electrical generators
- The generator itself producing electricity, coupled to the prime mover
- A heat recovery system processing heat from generator exhaust and the generator itself through a radial exchange cycle cooling system.
- Heat generated in the process is usually piped away into the equivalent of large-scale community or district radiator systems for space heating.

Critical Factors in Assessing the applicability of CHP: -

Primary considerations are the same as for biomass in respect of;

- Secure local availability of the fuel choice
- Permissions for chimney height and the appearance of the plant and measures for the mitigation of air pollution.

[4] Sometimes described as 'cogeneration' or 'total energy', particularly in the United States or European Union

The economic benefits of retro-fitting CHP – particularly when an old boiler system needs replacing for example - for smaller scale single user applications are well understood, in 2002 43% of UK CHP schemes had an installed electrical capacity of less than 100 kWe[5].

CHP at medium to large scale requires the co-development and installation of community heating network infrastructure lending itself well to the redevelopment of urban sites, new community build or rural cluster expansion.

- Higher build densities and layouts reduce the pipeline lengths servicing buildings thus reducing loss between point of heat production and delivery. Layouts of 40 to 45 dwellings per hectare have been suggested.
- Combined industrial and residential uses including hospitals and schools have been proven to successfully spread heat demand over different time periods making for better use of the output.
- A base with facilities for the CHP plant engineering, operations and maintenance staff will be required and including one major institution – i.e. government offices, a leisure centre or a hospital - may help provide this.
- Surplus power may be sold back to the grid.

Design and Permissions: -

See biomass

For more Information:-

www.cibse.org/chp

Information about micro-CHP which is expanding in the UK ;
www.microchp.co.uk

Hydrogen Fuel Cells are electrochemical conversion units which change oxygen and hydrogen into water producing electricity and heat during the process. The cells do not need recharging and will run constantly so long as they are fed oxygen and water.

Obtaining sufficient Hydrogen to feed the cells is done by splitting oxygen of from water molecules through electrolysis and this requires a power supply which will only make a fuel cell use renewable if the primary energy source is. The obvious benefit of renewably powered fuel cell technology is that the only by product is water.

Fuel cell technology is still at demonstration stage and therefore too costly and under tested for wide scale recommendation, wider scale commercialization is anticipated by 2010.

For more information: -

[5] DTI's Digest of UK Energy Statistics 2002

The Department of Trade and Industry website for independent information www.dti.gov.uk/energy/renewables/technologies/fuel_cells.html

Renewable Energy Standards, Policy and Legislation

Subsection of the Renewable Energy Chapter introducing policy framework containing the following information;

Local Context

The (*Local Authority)* (*add where applicable* Energy Strategy, Fuel Poverty Strategy, Climate Change Strategy, Environment Strategy) and vision place a strong emphasis on low energy design, the promotion of renewable energy and increased sustainability within the (*Local Authority)*.

The (*Local Authority)* Local Plan now (check) places requirements on most developers to demonstrate that they have fully considered the use of renewable energy technologies and the possibility of connecting to a community heating network system based upon CHP (*policy/policies???? see Appendix (X) consider Hyperlink for web based versions*). Energy efficiency issues must also be considered in the design process (*policy ???? see Appendix (X) consider Hyperlink for web based versions).*

Planning Policy Statement 22: Renewable Energy

States that;

1. **Developers** of renewable energy projects should engage in active consultation and discussion with local communities at an early stage in the planning process, and before any planning application is formally submitted.

2. **Local Development Documents should** contain positively expressed policies **designed to promote and encourage**, rather than restrict, the development of **renewable energy resources**. These should incorporate;

- Targets – which may be regionally devolved - for renewable energy projects in all new developments and some existing buildings, requiring a percentage of the energy to be used in new residential, commercial or industrial developments to come from on-site renewable energy developments. Such policies:
  - should ensure that requirement to generate on-site renewable energy is only applied to developments where the installation of renewable energy generation equipment is viable given the type of development proposed, its location, and design;
  - should not be framed in such a way as to place an undue burden on developers, for example, by specifying that all energy to be used in a development must be from on-site renewable generation.

Nb: Many Local Authorities are incorporating targets at levels above the recommended 10% by 2010 and 20% 2020 and/or at intervals interim to the basic targets to encourage more rapid assimilation of renewables into the locality.

- Only focus on the key criteria that will be used to judge applications. More detailed issues may be appropriate to supplementary planning documents.
- The specific requirements of renewable energy developments in both urban and rural areas.
- Recognise that some previously developed sites, whilst being unsustainable in terms of other land uses (e.g. a site in a remote location unsuitable for housing) may offer opportunities for developing some forms of renewable energy projects.
- The minimisation of visual effects (e.g. on the siting, layout, landscaping, design and colour of schemes
- Local Strategic Partnerships should foster and promote community involvement in, knowledge and greater acceptance by the public renewable energy projects
- Create criteria based policies which set out the circumstances in which particular types and sizes of renewable energy developments will be acceptable in nationally designated areas. Small-scale developments should be permitted within areas such as National Parks, Areas of Outstanding Natural Beauty and Heritage Coasts provided that there is no significant environmental detriment to the area concerned.
- Only allocate specific sites for renewable energy in plans where a developer has already indicated an interest in the site, has confirmed that the site is viable, and that it will be brought forward during the plan period.

Local Development Documents should not;

- Create planning policies ruling out or constraining the development any type of renewable energy technologies in any given location without sufficient reasoned justification. Government may intervene in the plan making process where it considers constraints proposed by local authorities are too great or poorly justified.
- Set arbitrary limits on scale of installations and noting for instance that visual impact may only be temporary if conditions are attached to permissions which require the future decommissioning of the installation
- Create “buffer zones” around international or nationally designated areas and apply policies to these zones that prevent the development of renewable energy projects
- Make assumptions about the technical and commercial feasibility of renewable energy projects. Technological change can mean that sites currently excluded as locations for particular types of renewable energy development may in future be suitable.
- use a sequential approach in the consideration of renewable energy projects (giving for example priority to the re-use of previously developed land for renewable technology developments) but encourage renewable

energy resources where ever the potential resource exists and will be economically feasible.

When dealing with Planning Applications Officers should;

- Recognise that wider environmental and economic benefits of all proposals for renewable energy projects, whatever their scale, are material considerations that should be given significant weight in determining whether proposals should be granted planning permission.
- Deal with the visual effects of installations on a case by case basis according to the installation type location and the landscape setting using objective assessment
- Give careful consideration to the visual impact of projects, located in the green belt, and encourage developers to demonstrate that projects clearly outweigh any harm by reason of inappropriateness; including wider environmental benefits associated with increased production of energy from renewable sources.
- Only grant permissions for renewable energy projects in sites with nationally recognised designations where they demonstrate that the objectives of designation in an area will not be compromised, and that any significant adverse effects on the qualities for which the area has been designated are outweighed by the environmental, social and economic benefits.
- Consider if the renewable energy project would have an adverse effect on an internationally designated nature conservation site (Special Protection Areas, Special Areas of Conservation, RAMSAR Sites and World Heritage Sites), permission should only be granted where there is no better alternative solution and there are imperative reasons of overriding public interest, including those of a social or economic nature.
- Assess planning applications against specific criteria set out in regional spatial strategies and local development documents, ensuring that such criteria-based policies are consistent with, or reinforced by, policies in plans for assessing other issues for renewable energy applications.

When dealing with Planning Applications Officers should not;

- Use local landscape and local nature conservation designations in themselves to refuse planning permission for renewable energy developments.
- Reject planning applications simply because the level of output is small.

Further guidance on the framing of such policies, together with good practice examples of the development of on-site renewable energy generation, are included in the companion guide to PPS22.

Regional context

A Regional Energy Strategy for Yorkshire and the Humber is currently being drafted. The Regional Policy Statement setting renewable energy targets for

the region has been published (*see Appendix (X) consider Hyperlink for web based versions)*. The Regional Spatial Strategy incorporates an energy hierarchy highlighting the regions priorities, these are;

- Reducing the Need for Energy
- The Conservation of Energy
- The Generation of Energy from Renewable sources.

These priorities will need to be implemented through the development planning process.

Planning Policy Statement 22: Renewable Energy
States that the **Regional Spatial Strategy should include;**

- Set targets for renewable energy capacity in the region to be achieved by 2010 and by 2020. Targets should be expressed as the minimum amount of installed capacity for renewable energy in the region expressed in megawatts and possibly additionally in terms of the percentage of electricity consumed or supplied.
- Where appropriate, targets in regional spatial strategies may be disaggregated into sub regional targets, possibly giving a broad indication of how different technologies could contribute towards regional targets. Specific technologies should not be given fixed targets such that technological change may make new sources of renewable energy more applicable in the longer term.
- Monitoring of progress towards achieving targets and regular review and revision of targets upwards should be by regional planning bodies. The fact that a target has been reached should not be used as a reason for refusing planning permission for further renewable energy projects.
- Criteria based policies applicable across the region, or clearly identified sub-regional areas. These should be used to identify broad areas at regional/sub-regional level where development of particular types of renewable energy may be considered appropriate.

National Context

The UK has committed to reducing the 1990 level of CO_2 emissions by 20% by 2010 and 60% by 2050.

The Energy White Paper '*Our energy future – creating a low carbon economy'* reminds us that whilst our demands for primary energy are still increasing our levels of self reliance on coal, gas and oil are declining and by 2020 we could be dependent on imported energy for three quarters of our total primary energy needs. The paper also suggests that the best way of maintaining energy reliability will be through energy diversity. To help us avoid over-dependence on imports, the paper suggests that by 2020 there will be;

- Much more local and community generation from sustainable sources
- Increasingly stringent efficiency standards for buildings and electrical goods

- An increasing number of Zero CO_2 Standard homes and business premises.

In January 2005 national government[6] published its Low or Zero Carbon Energy Sources – Strategic Guide (Interim Publication), outlining the principal reliance will come to depend upon renewables sources and their performance levels.

The Utilities Act 2000 obliges electricity and gas suppliers to achieve energy efficiency improvements and for electricity suppliers to purchase a minimum 10% of their supplies from renewable sources.

Planning

Revisions to the Planning Policy Statement 22 on Renewable Energy (incorporated under the local and regional sections above) now make clear that the wider benefits of renewable energy developments are material considerations in the approval of planning permissions.

European Context

EU Directive on Energy Performance of Buildings: Directive 2002/91/EC of the European Parliament and Council, on the energy performance of buildings, came into force on 4 January 2003 and must be adopted into UK legislation by January 2006. It will greatly affect awareness of energy use in buildings. All new buildings must meet the minimum energy performance requirements. For those with a useful floor area over 1000 m2 governments must ensure that, before construction starts, formal consideration is given to the following alternative systems for heating:

- CHP
- district or block heating or cooling
- heat pumps
- decentralised energy supply based upon renewable energy.

Governments must ensure that, whenever an existing building with a total useful floor area of over 1000 m^2 undergoes major renovation, its energy performance is upgraded

International Context

By becoming a signatory nation of the 1997 Kyoto Protocol the UK has signed up to a legally binding target of reducing greenhouse gases as a whole by 12.5% by 2008-12. In line with the advice of the Intergovernmental Panel on Climate Change (IPCC) the UK must aim for a reduction of 60% in CO_2 emissions by 2050.

[6] Office of The Deputy Prime Minister

It will be impossible to achieve such targets without developer maximising the integration of energy from local renewable sources where ever possible**.** This might include solar space and water heating, solar electricity generation (photovoltaics), wind power, biomass fuel and other sources of energy.

Voluntary Standards

In addition to all the legislative standards there are also some voluntary standards that developers are increasingly choosing to meet. The Energy Efficiency Best Practice Programme offers a set of standards for sustainable homes, these include;

- **Zero CO_2 Standard**. When energy demand is reduced as far as possible and you have replaced as much fossil-fuel use as possible with renewable energy, you may be able to create a 'zero CO_2' development. This may be achieved by buying electricity on a 'green' tariff from a company supplying renewable energy. If you use any non-renewable energy - eg, gas for cooking, you will need your own renewable electricity-generation capacity large enough to export sufficient power to the grid in any year to compensate for the CO_2 emissions associated with importing non-renewable energy.
- **Zero Heating Standard**. If, in addition to the Zero CO_2 Standard, you can obtain all your heating from passive solar gains and internal gains from the occupants, then you will have achieved the higher 'zero heating 'standard.
- **Autonomous Standard**. If, in addition to the Zero Heating Standard, you can obtain all your services from on-site resources, then you will have achieved an 'autonomous' standard. A grid-linked electricity system can be used as long as it is a net exporter rather than user of power.

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LAND USE

Land Use (for (add date) *or* in (Local Authority name))

Subsection of the 'Land Use Chapter'. Introduction to the context national, regional and local, generally including paragraphs containing the following information;

Available land in the UK is scarce, and stress must be placed on delivering the majority of new development using brownfield sites, reclaimed contaminated land or sites with only the lowest proven ecological value. Land formerly developed and existing buildings requiring refurbishment are priority resources which must be used to restrict the loss of greenfield sites. Sustainable land management should distribute use and activity in a manner creating access and opportunities, for current and future generations without diminishing future natural resources.

Sustainable urban design offers a strong competitive advantage, improving development quality and mix, integrating open space and historic features, will draw people to live and work in an area. Increased vibrancy will generate better footfall and interaction and activity throughout the day and night acting as a natural deterant to crime and improving the sense of community ownership, safety and enjoyment. In turn property and land values will increase.

Brownfield sites are generally located in areas with good or reparable public transport infrastructure and encouraging mixed build development of such sites provides people with facilities for their full range of needs, such as leisure, work, shopping and living, whilst decreasing their need to travel.

Brownfield sites will often still have ecological and/or architectural value. This must not be underestimated as it will enhance the value of the future environment if carefully assessed and protected prior to development. The character of the area and its surroundings must inform approaches to the design and landscaping of developments and all development should incorporate well integrated open space encouraging walking, leisure and appreciation of the final built features.

As well as giving a context for the buildings and amenity space, green-space and landscaped areas provide refuge for wildlife, soak away areas for surface water and the opportunity to retain existing trees and hedgerows or build in such features. All new development should ensure no net negative impact on the cities wildlife and habitat resources.

Developers should carry out surveys identifying the ecological impacts of their proposals. Where adverse impacts are identified a detailed mitigation package should be submitted. Developers will also be encouraged to show how their proposals will improve the ecological value of a site particularly in respect of previously contaminated land. Developers should;

- seek to avoid adverse impacts on designated nature conservation sites;
- ensure there are no adverse impacts on species listed in the UK Biodiversity Action Plan.
- take measures to ensure existing wildlife features are retained and enhanced;
- avoid culverting and canalisation of watercourses, exploiting opportunities to re-open culverts, re-establish natural watercourses and maximise the wildlife value of these
- adopt landscaping and planting schemes incorporating native or natural vegetation types as far as possible

- enhance wildlife resources through habitat creation and the creation and improvement of links between other areas of habitat
- make provision for the long term management of nature conservation resources, considering this at the design stage.
- Avoid planting schemes reliant on high summer watering or the use of peat or artificially produced fertilizers. Schemes using composted materials and mulching being preferable.

Aiming to create attractive environments for the combined purposes of living and working contributes to the regeneration of areas and the benefit of the wider community including health. Generously planted well designed, safe and attractive external spaces complementing the local landscape will encourage healthier, outdoor lifestyles.

To reaffirm this objective street layouts where cars predominate and safety is an issue should be avoided. Overall the principal goal of new development should be to minimise the need to travel. Early site appraisal should provide basic information necessary to determine accessibility by walking, cycling, public transport and car.

Developments should ensure ease of movement for pedestrians and cyclists as a priority. The movement of pedestrians and cyclists on routes both within and beyond the immediate development should be considered. In developments incorporating greater family orientated residential schemes developers should take special care to plan safe routes to schools which may cover related off road cycling or pedestrian provision.

The aim of all new development should be to minimize traffic throughout, reducing speeds and avoiding opportunities for rat-running. Site layouts should be determined according to a hierarchy, with access and movement priority being given to pedestrians and cyclists first. Developers should consider the following pointers in terms of their proposals;

Pedestrians:

- provide convenient routes throughout the site, that are easy, safe and attractive to use
- avoid steep gradients and ensure that routes are accessible to disabled people, particularly wheelchair users
- avoid the creation of routes through dark alleys and provide lighting where appropriate
- provide clear signposting showing route destinations, link routes to local facilities, public transport nodes, open spaces and longer distance footpaths
- provide a generous number of well located pedestrian crossing points on busy sections of road, design to slow traffic speeds, improve safety and reduce noise
- provide a pleasant environment and microclimate through planting to provide shelter and orientation towards the sun, provide path-side seating at appropriate locations

Cyclists:

- segregate cycle lanes from the general traffic where cyclists safety may be reduced within the carriageway, separate tracks may be considered in larger developments, if they can rejoin the road network safely
- only consider joint pedestrian and cycle routes where separate facilities for cyclists within the carriageway are not feasible, as pedestrian safety must not be compromised

- provide direct, safe and attractive routes, ensuring routes are as continuous as possible, avoiding frequent route stoppage, diversions or confusion to motorists. Ensuring the safety of cyclists is paramount at major junctions which should be of cycle friendly design
- link routes within developments to the wider authority cycle network
- provide secure sheltered cycle parking close to, or inside buildings, encouraging future owner employers to provide high standard secure long stay cycle parking and appropriate changing and shower facilities

Public transport and service vehicles:

- design should incorporate potential to link with or extend bus services and other public transportation, effective access for essential service vehicles should be provided.
- route layouts should utilize the minimum possible space allowing safe access and egress for buses and service vehicles
- bus shelter facilities and timetable information, should be provided encouraging use of public transport
- where developments generate additional demand for transportation including the need for improvement or extension, a contribution towards improving public transport provision may be required.

Private vehicles:

- service roads to the development should be engineered to occupy minimal space and designed to reduce speeds which may be stipulated as 20mph or less, particularly at junctions and pedestrian/cycle crossings, ensuring the priority of benign travel choices
- provide traffic free areas wherever possible.
- The Local Planning Authority may encourage the development of car free residential areas in urban areas with good access to public transport, cycle and pedestrian routes served by a range of facilities, such as schools, shops and other amenities. In such circumstances owners/tenants will be required to agree that they will not own a car to ensure off site parking problems do not result.

When deciding upon the appropriateness of site location developers should also consider the following issues:

- the need to locate large traffic generating uses close to existing key transport hubs
- the potential for links to the existing transport network, especially public transport, pedestrian and cycle routes and the need to consult with relevant bodies
- Best practice use and enhancement of a site's strongest links with surrounding areas

The National Governments Planning Policy Framework encourages Local authorities to ensure that:

'Development which attracts a lot of people should be concentrated in or on the edge of existing towns or suburban centres, or be within areas which are or can be well served by public transport. Higher density housing should be encouraged within easy walking distance of these centres'.

Higher building densities (ie greater numbers of people or dwellings per unit of area) give the most efficient use of land. Within urban areas such densities potentially reduce the need to travel, by incorporating local shops, working spaces and community facilities and may thus encourage higher use of public over private transport.

The highest densities should be adjacent to designated city and town centre areas ensuring that the majority of people live as close as possible to existing public transport routes, shops and facilities. Minimum levels of density especially in respect of the residential aspect of developments may be specified by the Local Planning Authority and developers may wish to consult the authority prior to submission of plans.

The creation of high density mixed tenure and use development will generally only improve vitality and diversity reducing the need to travel where housing and tenure types are integrated sensitively and adequate provision is made for 'affordable housing'.

The City of York Council specifies that a minimum of 30% affordable housing should be achieved as a proportion of all development including dwelling space. Developers should show the considered creation of mixed communities in the variety of sizes and types of housing and other property integrated within site plans.

Mixes should clearly show how potential problems of disturbance and nuisance caused by neighbouring potentially conflicting uses (eg. residential and nightclubs) have been addressed in the layout.

Higher densities should achieve other objectives and planners and developers should show in new development how provision has been made;

- to ensure proposals incorporate high levels of onsite renewable energy sourcing and expand or develop community grid networking, and/or combined heat and power (CHP) (see also the Energy Chapter and Renewable Energy Chapter). Developments facilitating CHP and district heating schemes are those which:
  - have groups and densities reducing installation and transmission costs
  - are located close to the power/heat source
  - comprise a mix of uses (eg. housing, offices and leisure) which help balance demand for power/heat over a twenty four hour period throughout the year.

- for the incorporation of existing natural and historic features (see also Chapter ‘Buildings Durability Adaptability and Materials’) which give rise to a 'sense of place or identity'.
- to ensure the integrity and quality of natural water courses and tables are not compromised (see also Chapter Water) Sites which are at risk from flooding or where the development would result in the loss of natural conservation space should be avoided.
- to foster urban regeneration, whilst sustaining and enhancing the vitality and viability of existing centres, ensuring appropriate weight is given to each of the key aspects of sustainability: environmental, social and economic.
- to ensure back gardens are designed for maximum privacy and shared gardens to incorporate a garden room layout encouraging diversity of use where possible.
- to provide space for food growing and kitchen waste recycling.

Standards, Policy and Legislation

Subsection of the 'Land Use Chapter' introducing policy framework containing the following information;

Local Context

Sustainability Appraisals

Local Planning Authorities are now required to conduct Sustainability Appraisals of the authority area, in consultation with environmental bodies (the Countryside Agency, English Heritage, English Nature and the Environment Agency) community groups and other stakeholders. Sustainability Appraisals document the relationships between the bio-diversity, human health, economic wellbeing and the architectural and cultural value of the Local Authority area.

Using the findings of the Sustainability Appraisal, as a baseline to improve from, the Local Planning Authority will assess proposals for development to ensure they show due consideration for and a balanced appreciation of environmental, health and equalities impacts and economic and social wellbeing. This process, described as Impact Assessment, will be carried out prior to granting consent for all major and some small scale development or redevelopment.

The Sustainability Appraisal process ensures that all plans, programmes and strategic documents reconcile the maintenance and improvement of the physical (or natural) environment with increased social and economic wellbeing.

The Sustainability Appraisal process provides a decision evaluation tool for Regional Planning Bodies and Local Authorities to:

- Assess the quality and format of base line data, highlight gaps, and ensure data is presented using criteria which translates locally regionally and nationally for comparator purposes.
- Methodically measure likely future impacts or improvements of proposals; i.e. through cyclical review.
- Ensure that proposals and options do not negatively impact upon environmental wellbeing or the quality of life of people living in an area and provide a starting point for more detailed assessment of proposals through impact assessments.

This is obviously important in respect of land use and related planning documents such as Transport Plans, Local Development Framework Core Strategy.

This said, Local Authorities should ensure that the Sustainability Appraisal tool they create can be used as a generic tool for the assessment of all strategic documents to capture the synergies and reduce conflicts. Ensuring that corporate documents embed sustainability through assessment and review.

Sustainability Appraisals and Impact Assessments support Local Authorities to identify problems or potential problems, sensitivities or damage and adopt approaches to strategic intervention and future planning objectives which will offset, remedy or improve the situation.

In accordance with the national Planning Policy Statement framework and Local authorities must now mark some clear breaks from recent development patterns, evidencing in the process a more rigorous approach to sustainability it is the Local Planning Authorities duty to ensure;

- Proposals for new out of town shopping centres cannot be granted by Local Authorities, where such proposals are considered the decision will be dependant on the regional view of their impact and benefit.
- Urban sprawl prevention and protect and discourage development of greenfield sites.
- Maximised access to and enjoyment of the countryside fringing urban areas
- The promotion of the use of brownfield central sites as a priority.
- The redevelopment of, or even new development of centres in deprived areas with the purpose of improving both the economic and physical environment.
- That planning for the largest or primary centre within the authority does not detriment the provision of goods and services within smaller centres.
- That development where ever possible incorporates mixed-usage i.e. shops and primary fronts - including businesses and recreation facilities with residential dwellings.
- That development is of a higher density, where sensitivities to the historic or cultural environment allow, to minimise the buildings footprint whilst increasing usable floor space.
- That development proposals minimise car usage and incorporate considerations which fully use, extend or enhance public transport networks, and, safe walking or cycling provision.

Local Development Documents

At a local authority level the current mixed system of unitary development plans (in West Yorkshire and South Yorkshire) and the two tier system of structure and local plans (in North Yorkshire and the Humber Authorities) is being replaced by local development frameworks (LDFs).

Strategic documents are interpreted by local development documents offering more detailed policy advice. Local Development Framework Documents (LDFs) are the principal reference point for decisions on planning applications. Developers are strongly advised to contact the Local Planning Authority about the content of these.

Proposals are often referred to and/or discussed with one or more specialist statutory organisations that input to the planning process. An example would be the Environment Agency having an interest where a major drainage facility or a waste licence is required.

Supplementary Planning Guidance/Documents

In addition to Local Development Documents, Local Authorities will also produce supplementary planning documents (formerly guidance (SPG)) this may take the form of design guides, area or site development briefs or issue-based documents elaborating on policies (or proposals) in the local development documents.

Supplementary planning documents must be adhered to by developers and will indicate where design constraints and opportunities may occur. Some SPGs, may specify the types of contribution(s) expected from larger site developers, for

instance those towards open space, public transport provision, and environmental performance criteria.

Developers should seek advice from the Local Planning Authority (LPA) before starting any development, whether new or refurbishment. LPA officers will be able to support them in understanding how the system works and where planning permissions and/or building regulation approvals for proposals are required.

Developers should also be aware that under PPS6 Planning for Town centres Local Authorities are encouraged to use tools such as area action plans, compulsory purchase orders and, where considered appropriate, town centre strategies to address the transport, land assembly, crime prevention, planning and design issues associated with the growth and management of their centres.

Regional context

When the Planning and Compulsory Purchase Act 2004, went through Parliament it changed the current pattern of development plans giving focus to the planning system. At a regional level Regional Planning Guidance (RPG) will be replaced by a 'Regional Spatial Strategy' (RSS) which will have statutory backing.

The RSS replaces RPG as the region's planning framework. It sets out a regional framework that addressing the 'spatial' implications of broad issues like healthcare, education, crime, housing, investment, transport, the economy and environment. This is all about 'how much', 'how big' and 'where' in the region.

Consultation on the 'pre-draft RSS' began in January 2005, the 'pre-draft' stage set out options and ideas on what could be in the draft RSS when it is submitted to Government. The consultation exercise ended in April 2005 and drew together input from over 170 organisations/individuals and generated around 4,000 comments in total. A 'Pre Submission Consultation Statement', setting out the Regional Assembly for Yorkshire and the Humber's consultation in the RSS process is available on their website.

National Context

Section 39(2) of The Planning and Compulsory Purchase Act, makes sustainability appraisal a mandatory requirement, plans must be prepared "with a view to contributing to the achievement of sustainable development".

Developers must understand that the system is statutory, i.e. governed by legislation, and that decisions are steered by planning policies that filter to the local level from the national level.

Planning Policy Statements

The principal form of central government guidance which influences the planning system is a series of Planning Policy Statements (PPSs) issued by the Office of the Deputy Prime Minister (ODPM). These set out policy thinking on a broad range of topics, from housing and transport to renewable energy, and must be taken into account by local authorities and government agencies when they write their planning policies or consider development proposals.

Minerals and Waste: Developers should also be aware that there are specialised Minerals and Waste Local Plans which apply across the whole county.

Land remediation relief: Businesses may claim relief from corporation tax if they clean up contaminated land, in the UK acquired by the company to carry out its trade and contaminated at the time it was acquired either wholly or in part. The relief can total upto of 150 per cent of the clean-up cost. Land remediation tax relief should be claimed for in **tax returns** and companies making a loss because of spending money on cleaning up land may apply for a tax credit of 16 per cent. The relief is only available to companies, not to individuals or partnerships.

European Context

The EU Strategic Environmental Assessment Directive

The SEA Directive now incorporated into required national planning frameworks was created with the objective of providing a high level of protection for the environment and ensuring that environmental considerations are integrated into the preparation and adoption of plans and programmes with a view to promoting sustainable development. Environmental assessments are required under the terms of the directive on plans and programmes which are likely to have significant effects on the environment.

Waste

Waste (for (add date) *or* in (Local Authority name))

Subsection of the 'WasteChapter'. Introduction to the context national, regional and local, generally including paragraphs containing the following information;

Unchecked, development produces significant levels of waste during the stages of demolition, construction and the later activities of future occupants. National Government has set challenging targets for waste recovery and recycling to ensure the objectives of the European Landfill Directive are met and waste is managed sustainably. To underpin this, landfill tax has been created to rise annually and encourage a curb on waste management that does not benefit our future environment.

To maintain both environmental and economic sustainability our present approaches to waste must increasingly follow the three R's principal;

Reduce; choose materials and products that are not excessively packaged, buy only what we will consume and lobby manufacturers to package in sustainable materials that can be readily recycled.

Re-use; separate materials, which may still have a valuable life span for others or ourselves and store such reclaimed materials securely until they can be re-deployed. This may simply mean mending items we might otherwise dispose of or taking old clothes to charity stores. Or finding out who locally will overhaul computers, white goods – fridges, cookers etc – or tools before finding them a new home. See also Chapter 'Buildings Adaptability Durability and Materials' 'Sustainable Demolition' section.

Recycle; the majority of waste we produce can be recycled, vegetable matter will make good compost for gardens and parks, most glass can be readily melted down to produce new products and that which can't may be used as road aggregate. Paper can be converted into new card and paper products and even certain plastics can be reformed anew.

Three main areas should be considered when constructing or refurbishing developments for sustainable waste management.

- Create a pre-build waste management site and strategy for the separation and re-use of materials; see Chapter 'Buildings Adaptability Durability and Materials'
- Ensure after auditing reusable onsite materials that new materials bought in are minimised in favour of reclaimed materials.
- Ensure the layout and design of the development provides future occupants with good waste separation facilities, working with the Local Authority to determine what will be needed. Facilities for waste segregation and recycling should be designed so that they are safe and convenient to use for all potential occupants.

Considering sustainable waste management during construction and as part of the design process creates distinct advantages for the developer including:

- Reducing direct costs to the developer in terms of landfill tax and waste handling costs including transportation and labour
- Increasing profitability of the build by more thorough quantity surveying and sustainable local sourcing of reclaimed materials

- Meeting the demands of the green consumer market who may pay a premium for buildings that have been designed to 'green' specifications or reject those which have not.

How Waste can be Reduced throughout Construction

- Audit the site for reclamation of onsite materials and take a deconstruction rather than demolition approach to buildings which need to come down
- Establish a recycling and reuse waste segregation and build centre on the site to ensure all materials including reclaimed or recyclable materials are properly stored and handled to minimise damage
- Carry out a waste audit identifying waste by type and making proposals for dealing with those waste streams. The emphasis should be on recycling both on and off site
- Carefully set aside and protect topsoil for use later in landscaping
- Use prefabricated assemblies as waste can be reduced, re-used and recycled more easily under factory conditions
- Use materials such as FSC timber, avoid all PVC based products, choose natural floor coverings, recycled materials in building fabric, low VOC-paints, etc which will not cause a future hazard.
- Avoid the practice of over-ordering construction materials.
- Choose reclaimed materials where possible i.e. bricks and stone where possible, timber, ornamental features, glass etc.
- Minimise the need to buy in aggregates but crushing suitable re-useable damaged brick etc on site

Use the BRE SMARTWaste tool to monitor waste as it is generated at site so immediate qualified steps can be taken to reduce it. The SMARTWaste (Site Methodology to Audit, Reduce and Target Waste) system is a web-based, integrated, approach to evaluating waste and its generation. It can be applied to any waste generating activity, and is adapted for the construction, demolition, refurbishment, manufacturing and pharmaceutical industries. In addition to identifying cost savings, improvements to resource use and productivity, the system is designed to demonstrate continuous improvement through:

- waste benchmarking
- identifying key demolition products for reuse or recycling
- identifying key waste products for reduction, reuse and recycling
- sourcing local resource and waste management facilities
- sourcing local supplies of reclaimed and recycled building products.

It includes four core tools: SMARTStart: defining preliminary environmental performance indicators (EPIs) for waste generation on a site by site, and organisation basis
SMARTAudit (detailed audit): a robust and accurate mechanism benchmarking waste and categorising by source, type, amount, cause and cost.
SMARTStart+ (monitoring and target setting): an opportunity to measure performance of contractors; an essential requirement under best value and continual improvement.
BREMAP (resource exchange): a geographical information system (GIS) that allows firms to reduce their transport of bulky waste by locating the nearest most suitable waste management site.
Tailored Pre Demolition Audits are also available. The audit provides a list of key demolition products (KDP) that can be assessed using a reclamation valuation

survey and translated into embodied energy and hectares of rainforest as an indicator of environmental quantification.

Standards, Policy and Legislation

Subsection of the 'Waste Chapter' introducing policy framework containing the following information;

Local Context

This section should outline the Authorities approach to strategic waste management and recycling indicating how the authority intends to achieve compliance with the other standards included below.

It should also detail any arrangements the authority made or its policy stance in relation to;

- the development of Aggregate Recycling Facilities in appropriate locations
- the development and or creation of reclaimed buildings materials storage facilities
- Other recycling or re-use provision the authority either offers or supports in conjunction with partner organisations

Questions: Does the Authorities Local Plan include a policy relating to substitute materials? Does this policy enshrine the re-use of building materials from other developments where this is technically and economically feasible as a top level priority?
Has the Local Authority considered facilities for or entertained favourable agreements with suppliers regarding recycled materials storage and distribution?
National policy urges increased use of secondary or recycled aggregates, how dothe local planning policies reflect this?
Has the Local Authority developed a voluntary 'considerate and sustainable constructor's charter'?

Regional

A draft of the new Regional Spatial Strategy (RSS) 'PLANet Yorkshire and to National Government by the Yorkshire and Humber Assembly by the end of April 2005.

In July 2001 the Assembly commenced work on the Regional Waste Strategy and this was finally adopted in 2003. The challenges set out in the Regional Waste Strategy are significant – the region currently performs poorly in terms of many sustainable waste management indicators.

During 2001-02 significant effort was made to raise the profile of waste management issues in the region. Numerous sub-regional and local events were held with stakeholder groups, local authorities and the public. Presentations set out the extent of the challenges and a range of potential responses were debated.
The Assembly also established a Regional Waste Steering Group to prepare the draft Regional Waste Strategy. A land-use planning focused Regional Technical Advisory Body (RTAB) has been subsequently set up to advise the region on waste planning issues and offer technical advice on the implementation of the policies presented in RSS. The spatial/land use planning elements of the Regional Waste Strategy were subsequently included in the Selective Review of RPG.

The Regional Waste Strategy for Yorkshire and the Humber is expected to be based upon the following aims:

- Working towards zero growth in waste at the regional level by 2020;
- Reducing the amount of waste sent to landfill in accordance with the EU Landfill Directive;
- Exceeding government targets for recycling and composting, with the objective to bring all parts of the Region up to the levels of current best practice;

Planning Policy Statement 10 for Sustainable Waste Management indicates that Regional Planning Bodies should prepare and deliver waste planning strategies that:

- Help deliver sustainable development through driving waste management up the waste hierarchy, addressing waste as a resource and looking to disposal as the last option but one which must be adequately catered for;
- Enable sufficient and timely provision of waste management facilities to meet the needs of their communities;
- Help implement the national waste strategy, and supporting targets, and are consistent with obligations required under European legislation;
- Help secure the recovery or disposal of waste without endangering human health and without harming the environment and ensure waste is disposed of as near as possible to its place of production;
- Reflect the concerns and interests of local communities, the needs of waste collection authorities, waste disposal authorities and business and encourage competitiveness;
- Protect green belts but recognise the particular locational needs of some types of waste management and that the wider environmental and economic benefits of sustainable waste management are material considerations that should be given significant weight in determining whether proposals should be given planning permission
- Ensure the layout and design of new development supports sustainable waste management.

European and National

The EU Directive on Waste, Planning Policy Statement 10 for Sustainable Waste Management (PPS10), and the National Waste Strategy for England and Wales (2000) all promote a comprehensive approach to waste management:
Reduce the amount of waste produced;
Make the best us of the waste that is produced; and,
Choose waste management practices which minimise risks of immediate and future environmental pollution and harm to human health.

In 2002 an Aggregates Levy was introduced for primary aggregates, with the aim of encouraging the use of recycled material. In 1999 only 17% of the aggregates used by the construction industry were recycled. The aim is to increase this to 25% by 2006.

The Antisocial Behaviour Act (Nov 2003) highlights a number of problems including flytipping.

The Clean Neighbourhoods and Environment Act 2005 contains a range of measures to improve the quality of the local environment by giving Local Authorities

and the Environment Agency additional powers to deal with things such as fly-tipped waste and litter.

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